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1988-89
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Technical State University
Greensboro, N. C.

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**BULLETIN OF NORTH CAROLINA AGRICULTURAL
AND TECHNICAL STATE UNIVERSITY**

Vol. 76, No. 6

May, 1989

BULLETIN OF NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY—
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NORTH CAROLINA AGRICULTURAL AND TECHNICAL
STATE UNIVERSITY

GREENSBORO

27411

(919) 334-7940



EDWARD B. FORT
Chancellor

TO: STUDENTS AND PROSPECTIVE STUDENTS

North Carolina Agricultural and Technical State University is a unique comprehensive state-supported University. It is the only comprehensive University in this State which has both a School of Engineering and a School of Agriculture—in consonance with its land-grant tradition. In addition, strong program offerings are provided in the College of Arts and Sciences, and the Schools of Business and Economics, Education and Nursing. And, the Graduate School continues with its nationally known uniqueness. Additionally, the new School of Technology places emphasis upon programs designed to accommodate the University's Hi-Tech Mode. Consequently, matriculating students are provided unique and varied programmatic offerings.

The University has a distinguished faculty—one committed to excellence in teaching, research and public services. Moreover, its Alumni Association is one of the most active and productive alumni organizations in the State and Nation. Its support for the University and its mission has been exemplary.

This Catalogue provides specific information you will need to know about the University. However, a University is more than its program offerings, its faculty, its students, its alumni or its campus. This University can best be described as one committed to excellence. North Carolina Agricultural and Technical State University—the Institution—would be a barren place without its adherence to that thesis. And that, of course, is what contributes to its heritage and tradition. It is depicted in the lives of both the Institution's Torchbearers as well as the outstanding men and women who left the University their legacy. The heritage and traditions of the University are evident in every facet of University life. When one combines this heritage with the quality of our faculty, the campus commitment to excellence and the soundness of our mission related programs, one readily discerns the greatness of the campus.

I commend this spirit, these programs and this University to all students and prospective students.

Edward B. Fort
Chancellor

An Equal Opportunity/Affirmative Action Employer

A Constituent Institution of THE UNIVERSITY OF NORTH CAROLINA

ARCHIVES

Bulletin
of
NORTH CAROLINA
AGRICULTURAL AND TECHNICAL
STATE UNIVERSITY
GREENSBORO, NORTH CAROLINA
UNDERGRADUATE PROGRAMS
1988-89
NORTH CAROLINA AGRICULTURAL AND
TECHNICAL STATE UNIVERSITY
Greensboro

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1988

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UNIVERSITY CALENDAR 1988-89

FALL SEMESTER, 1988

August 16—Tuesday	Administrator's Conference
August 17—Wednesday	Faculty-Staff Conference
August 18—Thursday	Freshmen Report
August 18—Thursday	Residence halls open for freshmen
August 18-23—Thursday-Tuesday	Orientation-Advisement of freshmen
August 23—Tuesday	Transfer students report
August 23—Tuesday	Residence halls open for transfer and readmitted students
August 24—Wednesday	REGISTRATION—New freshmen, new transfer and readmitted students
August 24—Wednesday	Residence halls open for upperclass and graduate students
August 25-27—Thursday-Saturday (Noon)	REGISTRATION—Upperclass and graduate students
August 29—Monday	CLASSES BEGIN
August 29—Monday	Late registration begins
September 5—Monday	Holiday (Labor Day)
September 6—Tuesday	Late registration ends
September 6—Tuesday	Last day to add a course
September 6—Tuesday	Last day to drop a course and receive financial credit
September 16—Friday	Last day to apply for Fall semester Graduation
October 5—Wednesday	FOUNDER'S DAY
October 13—Thursday	Mid-term grades due for freshmen and athletes
October 15—Saturday	Fall break begins at 12:00 (Noon)
October 15—Saturday	Residence halls close at 1:00 P.M.
October 18—Tuesday	Residence halls re-open at 1:00 P.M.
October 19—Wednesday	Fall break ends at 7:00 A.M.
October 21—Friday	Last day to drop a course without grade evaluation
October 29—Saturday	Homecoming
November 2—Wednesday	Last day foreign student applications accepted for Spring semester admission
November 10-11—Thursday-Friday	Pre-registration for Spring semester
November 23—Wednesday	Thanksgiving holidays begin at 1:00 P.M.
November 23—Wednesday	Residence halls close at 3:00 P.M.
November 27—Sunday	Residence halls re-open at 9:00 A.M.
November 28—Monday	Thanksgiving holidays end at 7:00 A.M.
November 28—Monday	Last day to withdraw from the University without grade evaluation
December 1—Thursday	Applications for Spring semester admission to University are due
December 10—Saturday	Classes End
December 12—Monday	Reading Day
December 13—Tuesday	Final Examinations begin
December 19—Monday	Final Examinations end
December 19—Monday	Fall Semester Ends, Christmas holidays begin
December 19—Monday	Residence halls close at 1:00 P.M.
December 20—Tuesday	All grades due in the Office of the Registrar by 3:00 P.M.

UNIVERSITY CALENDAR 1988-89

SPRING SEMESTER, 1989

January 3—Tuesday
 January 3—Tuesday
 January 3—Tuesday
 January 3-4—Tuesday-Wednesday

January 4—Wednesday

January 5-7—Thursday-Saturday

January 9—Monday

January 9—Monday

January 16—Monday

January 18—Wednesday

January 18—Wednesday

January 18—Wednesday

January 18—Wednesday

January 28—Saturday

February 28—Tuesday

March 4—Saturday

March 4—Saturday

March 12—Sunday

March 13—Monday

March 17—Friday

March 22—Wednesday

March 24—Friday

April 6-7—Thursday-Friday

April 18-20—Tuesday-Thursday

April 21—Friday

April 21—Friday

May 3—Wednesday

May 4—Thursday

May 5—Friday

May 7—Sunday

May 8—Monday

May 13—Saturday

May 13—Saturday

May 16—Tuesday

June 5—Monday

Faculty-Staff Report

Residence halls open for freshmen and transfer students

Freshmen and transfer students report

Orientation-Advisement of freshmen and transfer students

Residence halls open for upperclass and graduate students

REGISTRATION

Classes Begin

Late registration begins

University Holiday (Martin L. King's Birthday)

Late registration ends

Last day to add a course

Last day to drop a course and receive financial credit

Last day to apply for graduation

Ronald E. McNair Memorial Day

Mid-term grades due for freshmen and athletes

Spring break begins at 12:00 (Noon)

Residence halls close at 1:00 P.M.

Residence halls re-open at 9:00 A.M.

Spring break ends at 7:00 A.M.

Last day to drop a course without grade evaluation

Spring Semester Convocation

University Holiday (Good Friday)

Pre-registration for Fall Semester

Final examinations for graduating students

Last day to withdraw from the University without grade evaluation

Grades due at 2:00 P.M. in the Office of the Registrar for graduating students

Graduation letters for seniors, 2:00 P.M. Office of the Registrar

Classes End

Reading Day

C O M M E N C E M E N T

Final examinations begin

Final examinations end, Spring Semester ends

Residence halls close at 1:00 P.M.

All grades are due in the Office of the Registrar by 4:00 P.M.

Applications for Fall Semester admission to the University are due



Section 1 General Information

North Carolina Agricultural and Technical State University

HISTORICAL STATEMENT

North Carolina Agricultural and Technical State University was established as the A. and M. College for the "Colored Race" by an act of the General Assembly of North Carolina ratified March 9, 1891. The act read in part:

That the leading object of the institution shall be to teach practical agriculture and the mechanic arts and such branches of learning as relate thereto, not excluding academical and classical instruction.

The College began operation during the school year of 1890-91, before the passage of the state law creating it. This curious circumstance arose out of the fact that the Morrill Act passed by Congress in 1890 earmarked the proportionate funds to be allocated in bi-racial school systems to the two races. The A. and M. College for the White Race was established by the State Legislature in 1889 and was ready to receive its share of funds provided by the Morrill Act in the Fall of 1890. Before the college could receive these funds, however, it was necessary to make provisions for Colored students. Accordingly, the Board of Trustees of the A. and M. College in Raleigh was empowered to make temporary arrangements for these students. A plan was worked out with Shaw University in Raleigh where the College operated as an annex to Shaw University during the years 1890-1891, 1891-1892, and 1892-1893.

The law of 1891 also provided that the College would be located in such city or town in the State as would

make to the Board of Trustees a suitable proposition that would serve as an inducement for said location. A group of interested citizens in the city of Greensboro donated fourteen acres of land for a site and \$11,000 to aid in constructing buildings. This amount was supplemented by an appropriation of \$2,500 from the General Assembly. The first building was completed in 1893 and the College opened in Greensboro during the fall of that year.

In 1915 the name of the institution was changed to The Agricultural and Technical College of North Carolina by an Act of the State Legislature.

The scope of the college program has been enlarged to take care of new demands. The General Assembly authorized the institution to grant the Master of Science degree in education and certain other fields in 1939. The first Master's degree was awarded in 1941. The School of Nursing was established by an Act of the State Legislature in 1953 and the first class was graduated in 1957.

The General Assembly repealed previous acts describing the purpose of the College in 1957, and redefined its purpose as follows:

"The primary purpose of the College shall be to teach the Agricultural and Technical Arts and Sciences and such branches of learning as related thereto; the training of teachers, supervisors, and administrators for the public schools of the State, including the preparation of such teachers, supervisors and administrators for the Master's degree. Such other programs of a professional or occupational nature may be offered as shall be approved by the North Carolina Board of Higher Education, consistent with the appropriations made therefor."

The General Assembly of North Carolina voted to elevate the College to the status of a Regional University effective July 1, 1967.

On October 30, 1971, the General Assembly ratified an Act to consolidate the Institutions of Higher

Learning in North Carolina. Under the provisions of this Act, North Carolina Agricultural and Technical State University became a constituent institution of The University of North Carolina effective July 1, 1972.

Six presidents have served the Institution since it was founded in 1891. They are as follows: Dr. J. O. Crosby, (1892-1896). Dr. James B. Dudley, (1896-1925), Dr. F. D. Bluford (1925-1955), Dr. Warmoth T. Gibbs (1956-1960), Dr. Samuel DeWitt Proctor, (1960-1964), and Dr. Lewis C. Dowdy, who was elected President April 10, 1964. Dr. Cleon F. Thompson, Jr., served as Interim Chancellor of the Institution from November 1, 1980 until August 31, 1981. Dr. Edward B. Fort assumed Chancellorship responsibilities on September 1, 1981.

PURPOSE AND OBJECTIVES OF THE UNIVERSITY

North Carolina Agricultural and Technical State University is one of the two land-grant institutions located in the State. It is a comprehensive University with an integrated faculty and student body offering degrees at the baccalaureate and master's levels.

The purpose of the University is to provide an intellectual setting where students in higher education may find a sense of identification, belonging, responsibility, and achievement that will prepare them for roles of leadership and service in the communities where they will live and work. In this sense, the University serves as a laboratory for the development of excellence in teaching, research and public service.

The program of the University focuses on the broad fields of agriculture, engineering, technology, business, education, nursing, the liberal arts and science.

The major objectives of the University as approved by the faculty in 1977 are as follows:

1. To help students to improve their communication skills

2. To assist students in developing their power of critical thinking
3. To aid students in developing self-confidence and a positive self-image
4. To assist students in developing indepth competence in at least one subject area
5. To insure adequate career preparation for students that will enable them to lead productive lives
6. To develop innovative instructional programs that will meet the needs of a diverse student body
7. To develop and maintain undergraduate and graduate programs of high academic quality and excellence
8. To encourage research and other creative endeavors by the faculty and students
9. To identify and help to satisfy educational, cultural, and other public service needs in the service area of the University

POLICY GOVERNING PROGRAMS AND COURSE OFFERINGS

All provisions, regulations, degree programs, course listings, etc., in effect when this catalogue went to press are subject to revision by the appropriate governing bodies of North Carolina Agricultural and Technical State University. Such changes will not affect the graduation requirements of students who enroll under the provisions of the catalogue.

NONDISCRIMINATION POLICY AND INTEGRATION STATEMENT

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY is committed to equality of educational opportunity and does not discriminate against applicants, students, or employees based on race, color, national origin, religion, sex, age, or handicap. Moreover, NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY is open to people of all races and actively seeks to promote

racial integration by recruiting and enrolling a larger number of white students.

NORTH CAROLINA A & T STATE UNIVERSITY supports the protections available to members of its community under all applicable Federal laws, including Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 799A and 845 of the Public Health Service Act, the Equal Pay and Age Discrimination Acts, the Rehabilitation Act of 1973, and Executive Order 11246.

THE UNIVERSITY OF NORTH CAROLINA

The University of North Carolina is comprised of all the public institutions of higher education in North Carolina that confer degrees at the baccalaureate level or higher. The University was authorized by the State Constitution in 1776, and it was chartered in 1789 by the General Assembly.

The University of North Carolina opened its doors to students at Chapel Hill in 1795. Thereafter, beginning in the latter part of the nineteenth century, the General Assembly of North Carolina has established and supported fifteen other public senior institutions in keeping with Article IX, Section 8, of the Constitution of North Carolina which provides that the "General Assembly shall maintain a public system of higher education, comprising The University of North Carolina and such other institutions of higher education as the General Assembly may deem wise."

By 1969, The University of North Carolina included six constituent institutions, governed by a single Board of Trustees. This multi-campus University had its beginnings in legislation enacted in 1931 that defined The University of North Carolina to include the University of North Carolina at Chapel Hill, North Carolina State University at Raleigh, and The University of North Carolina at Greensboro. In the 1960's three additional campuses were added: The University of North Carolina at Charlotte, The University of North Carolina at

Asheville, and The University of North Carolina at Wilmington.

Beginning in 1877, the General Assembly of North Carolina established or acquired ten additional separately governed state-supported senior institutions of higher education. They are: Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina Agricultural and Technical State University, North Carolina Central University, North Carolina School of the Arts, Pembroke State University, Western Carolina University, and Winston-Salem State University. Then, in 1971, the General Assembly redefined The University of North Carolina, and under the terms of that legislation all sixteen public senior institutions became constituent institutions of The University of North Carolina.

The constitutionally authorized Board of Trustees of the six-campus University of North Carolina was designated the Board of Governors and this body is by law The University of North Carolina. The Board of Governors consists of thirty-two members elected by the General Assembly and it is charged with "the general determination, control, supervision, management, and governance of all affairs of the constituent institutions." The chief executive officer of The University is the President.

Each constituent institution of The University has its own faculty and student body. The chief administrative officer of each institution is the chancellor, and the chancellors are responsible to the President.

Each constituent institution also has a board of trustees composed of thirteen members: eight elected by the Board of Governors, four appointed by the Governor, and the elected president of the student body *ex officio*. (The School of the Arts has two additional *ex officio* trustees.) The principal powers of these institutional boards are exercised under a delegation of authority from the Board of Governors.

ORGANIZATION OF THE UNIVERSITY

Board of Governors The University of North Carolina

Philip G. Carson
Chairman
David J. Whichard, II
Vice Chairman
Mrs. Geneva Bowe
Secretary

Class of 1989

Mrs. Geneva J. Bowe
Philip G. Carson
Walter R. Davis
R. Phillip Haire
Mrs. Julia Taylor Morton
Asa T. Spaulding, Jr.
David J. Whichard, II
William K. Woltz

Class of 1991

Irwin Belk
Wayne A. Corpening
J. Earl Danieley
Charles D. Evans
Mrs. Joan S. Fox
James E. Holshouser, Jr.
Dr. Joy J. Johnson
Robert L. Jones
John R. Jordan, Jr.
Mrs. John L. McCain
Samuel H. Poole
W. Travis Porter
J. Aaron Prevost
Louis T. Randolph
Joseph E. Thomas
Gus Tulloss

Class of 1993

Roderick D. Adams
Charles Z. Flack, Jr.
John A. Garwood
Reginald F. McCoy
Mrs. Martha McNair
D. Samuel Neill
Maceo A. Sloan
Ms. Ruth Dial Woods

Members Emeriti

William A. Dees, Jr.
William A. Johnson

THE UNIVERSITY OF NORTH CAROLINA

OFFICERS OF ADMINISTRATION (Sixteen Constituent Institutions)

C. D. SPANGLER, JR.
B.S., M.B.A., D.H.L., LL.D.
President
ROY CARROLL,
B.A., M.A., Ph.D.,
Vice President-Planning
RAYMOND H. DAWSON,
B.A., M.A., Ph.D.,
Vice President-Academic Affairs
JASPER D. MEMORY
B.S., Ph.D.,
Vice President-Research and Public Service
L. FELIX JOYNER,
A.B.,
Vice President-Finance
NATHAN F. SIMMS, JR.
B.S., M.S., Ph.D.
Vice President-Student Services and Special Programs
JOHN W. DUNLOP,
B.A.,
Director, the University of North Carolina Center for Public Television
JAY M. ROBINSON,
B.S., M.A. Ed.D.
Vice President—Public Affairs
RICHARD H. ROBINSON, JR.
A.B., LL.B.,
Assistant to the President
WYNDHAM ROBERTSON
A.B.,
Acting Vice President—Communications
JOHN P. KENNEDY, JR.
S.B., B.A., M.A., J.D.,
Secretary of the University

GOVERNANCE OF NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

North Carolina Agricultural and Technical State University is a constituent institution of The University of North Carolina. It functions under the jurisdiction of a thirty-two member Board of Governors of The University of North Carolina elected by the General Assembly of North Carolina. Policies of the Board of Governors are administered by the President of the University and his staff. They constitute the General Administration and are located in Chapel Hill.

The Board of Trustees of North Carolina Agricultural and Technical State University consists of thirteen members. Eight members are appointed by the Board of Governors, four are appointed by the Governor of the State, and the President of the Student Government Association serves as an ex officio member. The Board of Trustees received its authority by delegation from the Board of Governors.

The Chancellor is the chief administrative officer of the University.

The University Senate and The University Council are the principal policy recommending bodies of the institution.

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

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*Director of The Freshman Advisement and
Learning Assistance Center*

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Director of Health Services
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B.S., M.S.,
Director of Student Activities
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*Assistant Vice Chancellor for Business
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B.S.,
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PHILLIP MANSFIELD,
B.S., C.P.A.,
*Assistant Comptroller and Director of
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B.S.,
Director of Personnel Services
JOSEPH DAUGHTRY,
A.A., B.A.,
Director of University Police Service
MAXINE D. DAVIS,
B.S., M.S.,
Director of Purchasing
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B.S.,
Director of Auxiliary Services
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B.S.,
University Engineer
DEVOR DANDY,
Food Service Director
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Treasurer
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B.S., C.P.A.,
Assistant Comptroller for Reporting

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*Director of Sports Information and
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Director of Cooperative Education
MARVIN WATKINS,
B.S., M.S.,
Director of Research Administration
DOROTHY R. COPELAND,
B.S., M.S.,
Director of Community Relations



Administrative Affairs

DOROTHY J. ALSTON,
B.S., M.A., Ed.D.,
Special Assistant to the Chancellor
JEWEL H. STEWART,
B.A., M.A., Ed.D.,
Director of Institutional Research
and Planning
WILLIE J. MOORING,
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Director of Computer Center
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Salary Administrator
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A.B., M.A., Ed.D., Litt. D.,
Chancellor Emeritus
WARMOTH T. GIBBS,
A.B., Ed.D., LL.D.,
President Emeritus

LOCATION

North Carolina Agricultural and Technical State University is located in the City of Greensboro, North Carolina. This city is 300 miles south of Washington, D.C. and 349 miles north of Atlanta. It is readily accessible by air, bus and automobile.

The city offers a variety of cultural activities and recreational facilities. These include athletic events, concerts, bowling, boating, fishing, tennis, golf and other popular forms of recreation.

The University is located near major shopping centers, churches, theaters and medical facilities. The heavy concentration of manufacturing plants, service industries, governmental agencies and shopping centers provide an opportunity for many students who desire part-time employment while attending the University.

THE PHYSICAL PLANT

The main campus of the University is located on land holdings in excess of 187 acres. The University farm located east of the Greensboro City limits includes approximately 600 acres of land and modern farm buildings. The approximate value of the physical plant is \$65 million.

University Buildings

L. C. Dowdy Administration Building
Dudley Memorial Building
F. D. Bluford Library
Richard B. Harrison Auditorium
Charles Moore Gymnasium
Coltrane Hall (Headquarters for N.C. Agricultural Extension Service)
The Memorial Union
The Oaks (Chancellor's Residence)
The Ellis F. Corbett Center
The Joseph Bryan House

Class Room and Laboratory Buildings

Carver Hall—School of Agriculture
Cherry Hall—School of Engineering
Crosby Hall—College of Arts and Sciences
Gibbs Hall—Social Sciences & School of Graduate Studies
Hodgin Hall—School of Education
Noble Hall—School of Nursing
Benbow Hall—Home Economics
Garret House—Home Economics
Hines Hall—Chemistry
Music Annex
Graham Hall Annex—Rockwell Center
Sockwell Hall—Agricultural Technology
Ward Hall—Dairy Manufacturing
Reid Greenhouses—Plant Science
Graham Hall—School of Engineering
Frazier Hall—Music-Art
Price Hall—School of Technology
Price Hall Annex—Child Development Laboratory
Campbell Hall—ROTC Headquarters
Barnes Hall—Biology
Merrick Halls—School of Business and Economics
J. M. Marteen Hall—Physics, Mathematics & Physical Science
Reed African Heritage Center—Museum
BC Webb Hall Animal Science
Ron McNair Hall—School of Engineering

Residence Halls

Curtis Hall
Holland Hall
Morrison Hall
Morrow Hall
Gamble Complex
Vanstory Hall
Cooper Hall
Scott Hall
Zoe P. Barbee Hall
Alex Haley Hall
Holt Hall

Service Buildings

Murphy Hall—Student Services
Dowdy Building—Student Financial Aid Office
Williams Hall—Cafeteria
Brown Hall—Post Office
Sebastian Health Center
T. E. Neal Heating Plant
Laundry—Maintenance Building

Clyde Dehuguley Physical Plant Building
Edwards House—Police Center
Union—Bookstore

Other Facilities

Alumni Stadium
Athletic field—including three practice fields for football, quarter mile track, baseball diamond and field house.
Register House
Strickland Fieldhouse
Environmental Studies Lab-Farm
Swine Research Center-Farm
Charles H. Moore School—Agriculture Research Center

COLLEGE, SCHOOLS AND DIVISIONS OF NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

North Carolina Agricultural and Technical State University includes the following college, schools and divisions:

The School of Agriculture
The College of Arts and Sciences
The School of Business and Economics
The School of Education
The School of Technology
The School of Engineering
The School of Nursing
The Graduate School
The Division of Continuing Education and Summer School

ACCREDITATION AND INSTITUTIONAL MEMBERSHIPS

North Carolina Agricultural & Technical State University is a fully accredited member of the SOUTHERN ASSOCIATION OF COLLEGES AND SCHOOLS.

The Department of Industrial Technology is accredited by the National Association of Industrial Technology

The Media Program is accredited by the Association of Educational Communications and Technology

The undergraduate programs in architectural, electrical, industrial, and mechanical engineering, leading to the B.S. degree, are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

The School of Nursing is accredited by the National League for Nursing, Department of Baccalaureate and Higher Degree Programs

The Teacher Education Programs are accredited by the National Council for Accreditation of Teacher Education

The Department of Chemistry is accredited by the American Chemical Society

The School of Business and Economics is accredited by the American Assembly of Collegiate Schools of Business
The Department of Accounting is accredited by the American Assembly of Collegiate Schools of Business

The Social Work Program of the Department of Sociology and Social Work is accredited by the Council on Social Work Education

The Department of Home Economics is accredited by The American Home Economics Association

The University holds institutional membership in the following associations:

American Association of Colleges for Teacher Education
American Association of Collegiate Registrars and Admission Officers
National Association of State Universities and Land Grant Colleges
American Association of Colleges of Nursing
American College Public Relations Association
American Council on Education
American Public Welfare Association
American Library Association
Association of American Colleges
Association of Collegiate Deans and Registrars
Association of Collegiate Schools of Architecture
College Language Association

National Association of Business Teacher Education
 American Personnel and Guidance Association
 National Association of Industrial Technology, International Association of Technology Education, and the American Driver and Traffic Safety Education Association
 National Association of Student Personnel Administrators
 Association of College Unions International
 National Association of College and University Food Service
 National Commission on Accrediting
 National Institutional Teacher Placement Association
 National League for Nursing, Council of Member Agencies, Department of Baccalaureate and Higher Degree Programs
 North Carolina Association of Colleges and Universities
 North Carolina League of Nursing
 North Carolina Library Association
 Southeastern Library Association
 Southern Regional Education Board Council on Collegiate Education for Nursing
 Graduates of the University are eligible for membership in the American Association of University Women

DEGREE PROGRAMS

Students who complete one or more of the courses of study listed below will be awarded the degree indicated.

Undergraduate Degrees

Accounting—B.S.
 Administrative Services—B.S.
 Agricultural Business—B.S.
 Agricultural Education—B.S.
 Agricultural Economics—B.S.
 Agricultural Science—B.S.
 Agricultural Technology—B.S.
 Art, Design—B.A.
 Art Education—B.S.
 Art, Painting—B.A.
 Architectural Engineering—B.S.
 Biology—B.S.
 Biology, Secondary—B.S.
 Business Administration—B.S.

Business Education, Secondary—B.S.
 Chemical Engineering—B.S.
 Chemistry—B.S.
 Chemistry, Secondary Education—B.S.
 Child Development—B.S.
 Civil Engineering—B.S.
 Clothing and Textiles—B.S.
 Communications—B.S.
 Computer and Information Sciences—B.S.
 Driver and Safety Education—B.S.
 Early Childhood Education (K-3)—B.S.
 Economics—B.S.
 Electrical Engineering—B.S.
 Engineering Mathematics—B.S.
 Engineering Physics—B.S.
 English—B.A.
 English, Secondary Education—B.S.
 Food and Nutrition (Including Dietetics)—B.S.
 Food Science—B.S.
 French—B.A.
 French, Secondary Education—B.S.
 Health and Physical Education—B.S.
 History—B.A.
 History, Secondary Education—B.S.
 Home Economics Education—B.S.
 Industrial Arts Education—B.S.
 Industrial Engineering—B.S.
 Industrial Technology—Automotive—B.S.
 Industrial Technology—Manufacturing—B.S.
 Industrial Technology—Construction—B.S.
 Industrial Technology—Electronics—B.S.
 Laboratory Animal Science—B.S.
 Landscape Architecture—B.S.
 Mathematics—B.S.
 Mathematics, Secondary Education—B.S.
 Mechanical Engineering—B.S.
 Music—B.A.
 Music Education—B.S.
 Nursing—B.S.
 Occupational Safety and Health—B.S.
 Physics—B.S.
 Physics, Secondary Education—B.S.
 Political Science—B.A.
 Professional Theatre—B.A.
 Psychology—B.A.
 Recreational Administration—B.S.
 Social Science, Education—B.S.
 Sociology—B.A.
 Social Work—B.S.W.
 Special Education—B.S.
 Speech and Theatre—B.A.; B.F.A.

Transportation—B.S.
 Vocational-Industrial Education—B.S.

*Graduate Degrees

MASTER OF ARTS

English and Afro-American Literature

MASTER OF SCIENCE

Adult Education
 Agricultural Economics
 A. Agricultural Marketing
 B. Production Economics
 C. Rural Development
 Applied Mathematics
 Architectural Engineering
 Biology
 Chemistry
 Electrical Engineering
 Engineering
 Food and Nutrition
 French
 Industrial Engineering
 Mechanical Engineering
 Plant and Soil Science
 Transportation
 Specialized Teaching and Related Fields
 A. Administration, Supervision and Post-Secondary Education
 (1) Administration
 (2) Supervision
 B. Agricultural Education
 C. Education Media
 D. Elementary Education and Reading
 (1) Early Childhood Education
 (2) Elementary Education
 (3) Intermediate Education
 (4) Reading
 E. Guidance or Counseling Education
 (1) Agency Counseling
 (2) Counselor—Education
 (3) Human Resources
 F. Industrial Education
 (1) Industrial Arts Education
 (2) Vocational Industrial Education

G. Safety & Driver Education
Specialized Secondary Education
Teaching Fields with Majors in
Subject Matter Departments

- A. Art
 - B. Biology
 - C. Chemistry
 - D. English
 - E. History
 - F. Mathematics
 - G. Health and Physical Education
 - H. Social Science
- Certificate in Advanced Graduate Studies—Educational Media

* See Graduate School Bulletin for complete instructions

FERDINAND DOUGLASS BLUFORD LIBRARY

The University library, the Ferdinand Douglass Bluford Library, gets its name from Dr. Ferdinand D. Bluford, President of the Institution from 1925 to 1955. The library is a five-story facility located near central campus. The current holdings include 338,504 book volumes, 1,692 serial subscriptions, and, as a select depository in North Carolina for United States government documents, the library contains a collection of over 173,928 official publications. Other holdings include a superior collection in films, microforms and other audio visuals. The library maintains special collections in Archives, Black Studies, Teacher Educational Materials, and a Chemistry Collection located in the Chemistry Department in Hines Hall on the campus.

Special services are provided through a formal and informal library use instructional program, computerized literature searching, Interlibrary loans, and public access photocopiers. During the academic year the library is open ninety-two hours each week as shown below. Variations in this schedule are posted at the front entrance of the library.

Monday-Thursday
8:00 a.m.-12:00 a.m.
Friday
8:00 a.m.- 8:00 p.m.
Saturday
9:00 a.m.- 5:00 p.m.
Sunday
2:00 p.m.-10:00 p.m.

Educational Support Centers

The University's educational support centers include the Learning Assistance Center, the Audiovisual Center, the Closed Circuit Television Facility, a 10-watt student-operated educational Radio Station, the Computer Center, the Reading Center, Language Laboratory, and the Center for Manpower Research and Training.

Museums

The H. Clinton Taylor Art Gallery located in the F. D. Bluford Library and the African Heritage Center are two outstanding art museums. Throughout the year, these museums have on display a number of special exhibits of sculpture, paintings, graphics, and other media.

OFFICE OF CONTINUING EDUCATION AND SUMMER SCHOOL

The Office of Continuing Education and Summer School provides educational and training opportunities for the nontraditional learner who desires such for career change or advancement; degree and certification requirements; or intellectual and cultural stimulation. Activities conducted by this office include the *administration of Continuing Education, Summer School, Extended Day Program, International Programs and Adapted Physical Education*.

The *Continuing Education Program* provides the administrative structure and coordination of extension credit courses, conferences, workshops and short courses. The staff works with faculty and community groups to develop learning activities to meet the education needs of individuals or groups.

The *Extended Day Program* is the coordinating unit for departments that offer classes in the evening and on weekends for students who are employed or otherwise not available during the 8 to 5 day.

The *Summer School* consists of two 5½ week sessions and a two week intersession, with short courses and workshops interspersed

through the two sessions. This program provides summer study to meet the needs of graduate and undergraduate degree seeking students, teachers and other professionals, or any other persons for whom summer study will be of benefit in the attainment of their educational goals.

Additionally, the office also coordinates the *Adapted Physical Education Program*. This program provides training and technical assistance to physical educators, classroom teachers and other teachers of handicapped children in every local education administrative unit in the State.

THE COMPUTER CENTER

A computer facility is available to the University's faculty, staff and students for the development of curriculum programs, administrative systems, assistance in research and tutorial services.

The Computer Center provides two distinct services: administration data processing of students, personnel, and facilities data which entails system design, system development, programming implementation; and support of academic instruction and research computing for the educational community and implements education software systems.

The Center maintains an application system library with the necessary documentation of all available software packages and computer instructional material available to faculty and students.

Available to the university community are five computer laboratories equipped with on-line terminal devices and microcomputers providing instant response to the users in program development, CAI lessons and databases queries. Also available in the Center are hardcopy and CRT terminals.

The computer system in use at the Center is a DECsystem-10 with 2048 word memory, 16,000,000 character disk, 2 tape drives and 2 high-speed line printers.

The TOPS—10 Operating System V7.02 supports ALGOL, BASIC, COBOL, FORTRAN, MACRO and

APL, SYSTEM 1022 (Data Base Management), 144 terminal connection ports and terminals located in many offices and departments on campus.

Two administrative computers forming a VAX computer cluster consisting of a VAX 8650 with 32 megabytes of memory and VAX 11/750 with 8 megabytes of memory with a VMS operating system running on Ethernet via Decnet.

The Academic computers consist of a VAX 11/780 and a VAX 11/785 with 16 megabytes of memory run-

ning a VMS Operating System. The VMS operating system supports COBOL, FORTRAN, BASIC and ADA.

The Computer Center maintains a staff with experience in the following areas: business, mathematical, operations, data entry, program development, systems programming and systems analysis and design. Consultation services are available upon request.

COOPERATIVE EDUCATION

Cooperative Education is a carefully organized and supervised program of "Experiential Learning" in which the participating student enriches his or her education by alternating periods of classroom study with periods of work related to his or her academic major. It is **OPTIONAL** on the part of the student and is **COUNSELING-CENTERED**. The objective of the program is to enrich the Total Educational Experience of involved.



THE LEARNING ASSISTANCE CENTER

The Learning Assistance Center is organized to provide special services to students who need assistance in strengthening their reading communication and computational skills. The objective of this program is to help each enrollee to develop a foundation for completing his or her college career.

The program provides special classes in English, Reading and Mathematics. It offers tutorial services and helps the enrollees to develop study skills.

PIEDMONT INDEPENDENT COLLEGE ASSOCIATION OF NORTH CAROLINA

The Piedmont Independent College Association of North Carolina is an organization comprised of North Carolina Agricultural and Technical State University, The University of North Carolina at Greensboro, High Point College, Greensboro College, Bennett College, Guilford College and Guilford Technical Community College. The organization promotes interinstitutional cooperation and cooperative educational activities among the seven institutions. Agreements provide the opportunity for any student to enroll at another institution for a course or courses not offered on one's home campus.

OFFICE OF DEVELOPMENT AND UNIVERSITY RELATIONS

The Office of Development and University Relations is maintained by the University not only to assist with the overall institutional development, but also to promote its continual interest among alumni, parents, friends, foundations, corporations and other sectors of the national community. It encourages annual alumni giving, deferred giving and conducts special fund campaigns. The office embraces the following areas of operation: Alumni Affairs, Office of Research Administration, Cooperative Education, Public Information, Industry Clus-

ter, Fund Raising, Publications, Public Relations, Legislative Relations, Industrial Liaison, Sports Publicity and special educational projects.

In addition, the Office aids in conducting the affairs of the North Carolina A&T University Foundation, Inc., which has been established to assist in soliciting gifts, grants and contributions from other than state sources for such worthy purposes as student scholarships, faculty development, library resources, specialized equipment, and cultural and public service programs.

The Office is conveniently located in Suite 400 of the Dowdy Administration Building.

THE OFFICE OF RESEARCH ADMINISTRATION

The Office of Research Administration was established for the purpose of promoting research at the university by encouraging and assisting faculty members to develop proposals for research projects and educational programs. In so doing, it also insures that sponsored support for research and academic projects is compatible with university objectives, avoids unnecessary duplication of programs, assures compliance with special safeguard procedures of the sponsoring agencies, and publishes and disseminates the research conducted at the university.

Additionally, the office of Research Administration is organized to administer the research programs of the university. It has the primary responsibility of establishing contact and maintaining a liaison with federal and state funding agencies to keep abreast of current information. The office compiles and disseminates descriptive materials to faculty interested in extramurally funded activities. The office serves as a conduit through which flows pertinent and valuable information between the university and the support agencies. The office operates a grantsmanship library consisting of the most up-to-date directories, program brochures, guidelines, manuals, application forms and other material useful in seeking funds for projects.

AUXILIARY SERVICES

The Office of Auxiliary Services is responsible for administering, planning, and directing the University auxiliaries, such as the Bookstore, Food Service, Laundry, and Ticket Operations. This office also supervises and serves as Business Manager for the Athletic Department.

Each auxiliary relates directly to the objectives of the University. Their significant contributions to the realization of University objectives are measured directly by the quality of services rendered. Such functions provide needed services and also allow the University to benefit from these services without substantial cost.

BOOKSTORE

The Bookstore is responsible for selling and distributing textbooks, study aids, student supplies, departmental supplies, and souvenirs to the students, faculty, and staff.

LAUNDRY

The Laundry is responsible for the preparation and cleaning of laundry on the University campus. It offers expeditious and convenient services to students, faculty, and staff at a reasonable cost.

TICKET OFFICE

The University Ticket Office is located in Room 102 of the Memorial Student Union. This office sells tickets for all university sponsored events and issues student athletic passes.

Student Life

STUDENT DEVELOPMENT SERVICES

The broad objective of the program of Student Development Services is to aid students in

developing the attitudes, understandings, insights and the skills which will enable them to express themselves as socially competent persons. The program places special emphasis on campus relationships and experiences which complement formal instruction. More specifically, the program of Student Development Services is conceived as a continuing exercise of identifying and remedying the daily life problems of the student. Accordingly, very definite efforts are made:

1. To help students become better acquainted with themselves and the various problems confronting them.
2. To help students to develop the ability to make satisfactory choices and adjustments.
3. To aid students in making desirable adjustments in group relationships.
4. To provide cultural and social experiences which will help students to develop an appreciation for the best in their cultures.
5. To promote the physical, mental, moral and spiritual development of students.

The Vice Chancellor for Student Affairs directs student development services, Counseling Services, Housing, Health Services, the Placement Services, Memorial Union, International and Minority Student Affairs, Veterans and Handicapped Student Affairs, faculty advisors, other individuals and agencies. Some of these services are described as follows:

COUNSELING AND TESTING CENTER

The University makes provisions for counseling, testing and guidance for all students through the Counseling and Testing Center, located in 108 Murphy Hall.

The Counseling and Testing Center conducts a testing program for all freshmen students. The results of this program are used to assist freshmen in the planning of their educational and vocational careers. The Office conducts other testing programs that are required or desired by the departments of the University.

The Counseling and Testing Center offers students the opportunity to discuss with a trained professional counselor or clinical psychologist any questions, dilemmas, needs, problems or concerns involving educational, career/vocational, social, personal or emotional adjustment that may occur during the college years.

The following is a list of services available through the Counseling and Testing Center:

1. Individual and group personal and social counseling.
2. Academic and Career/Vocational Counseling.
3. Individual test administration and interpretation covering the areas of intelligence, aptitude, personality, interest, achievement and other areas requiring special needs.
4. University Diagnostic and Placement Testing Program for all freshmen to assist in the planning of their educational and vocational careers and other programs required or desired by departments of the University.
5. College Level Examination Program (CLEP) for Course Credit by Examination.
6. National Testing Program which includes administration of the Graduate Record Examinations, National Teacher Examinations, Graduate Management Admission Test, Veterinary Aptitude Test and other similar examinations.
7. Graduate student internship training laboratory.
8. Graduate school information and cooperation in the placement of graduates who desire to pursue graduate studies.
9. Withdrawal Exit Interviews.
10. Outreach counseling programs and activities.

All counseling is voluntary, free of charge, private and confidential.

HEALTH SERVICES

The Sebastian Health Center maintains a staff of doctors and nurses who are qualified to give professional attention to the health problems of students.

The basic components of the Health Service Program are as follows:

1. *Medical Services:*

The University maintains a Director of the Health Services. The University Physicians and Physician Extender are in attendance in the Health Center daily from 8:00 a.m.-5:00 p.m.—and “On 24 hour call” for any emergency situations.

2. *Nursing Services:*

Registered nurses, under the direction of a Head Nurse, are in attendance daily on a twenty-four hour basis to treat and evaluate students health needs and answer any questions pertaining to health problems and other concerns.

3. *Laboratory Services:*

A Certified Laboratory Medical Technologist is on duty daily, Monday-Friday to perform various laboratory tests as ordered by the physician extender, such as pregnancy testing, urinalysis, various blood tests, testing for sexually transmitted diseases, and diabetic screening.

4. *Follow-up and Consultation Services:*

Follow-up services are given through the Health Center and referrals to specialists and various community agencies are made upon the recommendations of the University Physicians.

5. *Physical Examinations:*

a. Special student groups are given complete physical examinations at the Student Health Center. These groups usually includes athletes, nursing students, student teachers and advanced R.O.T.C. cadets. An entrance medical history form is required prior to participation in these activities.

b. All freshmen and transfer students are required to secure a complete physical examination, provide proof of a current Tuberculin Skin Test, Tetanus Booster and all childhood immunizations. Follow-up examina-



tions are made at the Student Health Center when necessary.

FOOD SERVICES

The University provides food services for students at a reasonable cost. A snack bar is located in the Memorial Student Union Building. Students who live in the residence halls are required to eat in the cafeterias. Students who live off campus may purchase meals also.

HOUSING

The residence halls provide opportunities for personal, social, and intellectual companionship as well as experiences in group living.

Housing facilities for women are provided in Curtis, Morrow, Holland, Morrison, Vanstory, Zoe Barbee and Holt Hall. Men are housed

in Cooper, Scott, Alex Haley and Gamble Complex.

The Director of Housing provides assistance for students in locating off-campus housing.

THE MEMORIAL UNION

The Memorial Union began operations in the Spring Semester of the 1966-67 academic year. It is a "Community Center" serving diverse needs. It embraces a wide variety of facilities and performs a multiplicity of functions.

The facilities include: Lounges, Reading Room, Student Organization Meeting Rooms, Music Room, Games Rooms, Ballroom, Office Space, Bookstore, Bowling Lanes, Dining Room and Snack Bar, Information Center, Barber Shop, Beauty Shop, and Guest Rooms.

Additionally, the Memorial Union serves as a Student Activity Headquarters, Recreation Center, Cultural Center, Ticket Bureau, Public

Relations Agency, Art Gallery, and Forum and Workshop Center.

The physical proximity provides a co-curricular community for students, faculty, alumni and publics served by the University. The Memorial Union facilitates a positive social, recreational and cultural mission.

STUDENT ORGANIZATIONS AND ACTIVITIES

The University provides a well-balanced program of activities for moral, spiritual, cultural and physical development of the students. Religious, cultural, social and recreational activities are sponsored by various committees, departments, and organizations of the University. Outstanding artists, lecturers and dramatic productions are brought to the campus.

A listing of student organizations, their purposes, objectives, etc., is published annually.

STUDENT CONDUCT

Students enrolled at North Carolina Agricultural and Technical State University are expected to conduct themselves properly at all times. They are expected to observe standards of behavior and integrity that will reflect favorably upon themselves, their families and the University. They are expected to abide by the laws of the city, state, and nation, and by all rules and regulations of the University.

Accordingly, any student who demonstrates an unwillingness to adjust to the rules and regulations that are prescribed or that may be prescribed to govern the student body will be suspended or expelled from the institution. Furthermore, any student who violates the rules and regulations of the University will be suspended.

A student may forfeit the privilege of working for the University when, for any reason, he or she is placed on probation because of misconduct.

VETERANS AFFAIRS AND SERVICES

North Carolina A. and T. is an approved University for veterans and other eligible persons (children and spouses), who wish to attend and receive benefits under the Veterans' Readjustment Benefits Act of 1966.

Persons wishing to attend the University under the Veterans Administration Educational Training Program should apply first to the Veterans administration for a Certificate of Eligibility. Simultaneously, they should apply for admission to North Carolina A. and T. State University through normal admissions procedures. However, the issuing of a Certificate of Eligibility by the Veterans Administration does not automatically assure a student of admission to North Carolina A. and T. State University.

An Office of Veterans Affairs is established to assist veterans with enrollment and adjustment to college life. Upon enrolling at North Carolina A. and T. State University, the veteran or eligible person should report to the Office of Veterans

Affairs for certification. If a Certificate of Eligibility has not been issued, the veteran or the eligible person should present the following:

1. Certified copy of separation form (DD 214).
2. Marriage certificate (for married veterans only).
3. Copy of divorce decree, if veteran or spouse has been married more than once.
4. Birth certificates of dependent children (veterans only).

In addition to the above, the Office of Veterans Affairs provides counseling, testing and evaluation, tutorial, recruitment and outreach services.

HANDICAPPED STUDENT AFFAIRS

The Office of Handicapped Student Affairs is established to identify academic programs, student services, and student activities, to assure that they are readily accessible to the handicapped student. Likewise, it focuses on facility accessibility for all handicapped students.

It serves as a liaison for all handicapped students as they participate in programs and activities enjoyed by all students.

All information and services for the handicapped are handled through this office.

CAREER PLANNING AND PLACEMENT

The Career Planning and Placement Center at North Carolina A. and T. State University has as its major objective the procurement of satisfactory, temporary, part-time, summer or permanent employment for students, prospective graduates and alumni of the University. Other objectives and services for students include the arrangement of individual and group conferences for career counseling purposes and the scheduling of interviews between interested students and representatives of various employing firms, government agencies, businesses, and school administrators. Services are always performed with a con-

scientious and sincere interest for both prospective employers and employees. A minimum service charge will be assessed to the alumni of the University to off-set service rendered. The Placement Office is located in Room 101, Murphy Hall.

OFFICE OF INTERNATIONAL AND MINORITY STUDENT AFFAIRS

The Office of International and Minority Student Affairs is responsible for planning, developing, coordinating, and implementing services and programs to meet the needs of international and minority students. The office serves as a liaison for on-campus offices, support services and administrators who serve or share a responsibility to the academic, cultural, political and social/personal development of those students. The office strives to promote positive interaction, communication and awareness among the students, faculty and community.

The office offers a wide range of services to international students which include orientation, counseling, advisement, and prearrival preparation in the areas of immigration, academic, financial, cultural, social, personal, health and housing needs, concerns or requirements.

Programs for students are coordinated with religious, civic, social, academic and international students organizations at this and other institutions.

Over one thousand international and minority students attend the University. Sixty countries have been represented by these students who bring with them diverse cultural backgrounds.

The University welcomes international and Minority students as valuable resources in the promotion of international understanding.

Eligibility for issuance of the Form I-20 [Certificate of Eligibility for Nonimmigrant (F-1) Student Status for Academic and Language Students] is evaluated by the Office of International and Minority Student Affairs, upon receipt of all official documents, including financial guarantee. The receipt of a Letter of

Acceptance from the Admissions Office does not automatically qualify a prospective student to receive a Form I-20.

The University is not licensed to issue the Form IAP-66 to J-1 non-immigrants. J-1 Nonimmigrants who possess valid IAP-66s to matriculate at this university from agencies authorize to issue these forms and have met all university requirements may attend.

All nonimmigrants are required to register with the Office of International and Minority Student Affairs prior to registering for classes.

The office is located in Murphy Hall, Room 221, at the corner of Nocho Street and S. G. Thomas Drive. The Telephone Number is (919) 334-7551.

Expenses and Financial Aid

GENERAL INFORMATION

NORTH CAROLINA A & T STATE UNIVERSITY IS A PUBLICLY SUPPORTED INSTITUTION. TUITION PAYMENTS AND OTHER REQUIRED STUDENT FEES MEET ONLY A PART OF THE TOTAL COST OF THE EDUCATION OF STUDENTS ENROLLED. ON THE AVERAGE, FOR EACH FULL-TIME STUDENT ENROLLED IN AN INSTITUTION OF THE UNIVERSITY OF NORTH CAROLINA, THE STATE OF NORTH CAROLINA APPROPRIATED \$5,376 PER YEAR IN

PUBLIC FUNDS TO SUPPORT THE EDUCATIONAL PROGRAMS OFFERED.

THE UNIVERSITY RESERVES THE RIGHT TO INCREASE OR DECREASE ALL FEES AND CHARGES AS WELL AS ADD OR DELETE ITEMS OF EXPENSE WITHOUT ADVANCE NOTICE AS CIRCUMSTANCES, IN THE JUDGMENT OF THE ADMINISTRATION, MAY REQUIRE.

Boarding and Lodging fees are based on the actual number of days school is in session and do not include holidays, breaks, or any other University Vacations.

Students' property in dormitories and other University buildings is at the sole risk of the owner, and the University is not responsible for loss, theft, or damage to such property arising from any cause.



Students are required to pay for any loss or damage to University property at replacement cost due to abuse, negligence, or malicious action, in addition to being subject to disciplinary action.

The costs of required "hardback" textbooks are included in the required fees for undergraduate students only. The cost of reference books, workbooks, supplies, and "soft-back" books are not included in the required fees. All rental textbooks are required to be returned not later than the final day of examinations each semester. The cost of rental textbooks not returned as stated above will be added to the students' accounts. Other policies and procedures governing the Book Rental System can be obtained from the University Bookstore.

Personal spending money should be sent directly to and made payable to the student in the form of money orders or certified checks. As a policy, the University does not cash personal checks for students in any amount.

Diplomas and transcripts are withheld until the student has paid in full all fees and charges due the University. A student in debt to the University in any amount will not be permitted to register for any subsequent semester until his or her obligations are paid. If special financial arrangements have been made, failure to comply with these arrangements as stipulated will result in the student being withdrawn from the University for non-payment of required fees.

Special Notice to Veterans

Veterans attending school under the provisions of Public Law 89-358 receive a monthly subsistence allowance from the Veterans Administration. Therefore, veterans are responsible for meeting all of their required fee obligations.

Veterans attending school under the provision of Public Law 894 (Disabled Veterans) receive a monthly subsistence allowance from the Veterans Administration and also, the Veterans Administration pays directly to the school the cost of the veteran's tuition and required fees. All other fees are the responsibility of the veteran.

Veterans may contact the Veterans Affairs Office on Campus for any special consideration which may be available.

REQUIRED DEPOSITS, CHARGES AND FEES

All registration fees and charges are due and payable in full before or at the beginning of registration for each semester. Payments made by mail must be postmarked not later than August 14 for the fall semester, and December 15 for the spring semester.

ALL PAYMENTS MUST BE MADE BY CERTIFIED CHECK, BANK DRAFT, MONEY ORDER, OR CASH. Personal Checks will not be accepted. Checks, drafts, and money orders must be made payable to North Carolina A. & T. State University, and sent directly to:

Treasurer's Office
Dowdy Administration
Building
North Carolina A. & T. State
University
Greensboro, NC 27411

**PLEASE DO NOT SEND
CASH PAYMENTS BY MAIL!
A \$15 NON-REFUNDABLE
APPLICATION FEE IS RE-
QUIRED OF ALL APPLI-
CANTS.**

HOUSING DEPOSIT

A housing fee of \$75 is required of all students who plan to live on campus and is to be paid in the following manner:

1. A continuing student that obtains a valid Housing Random Selection Process (lottery) Number must pay deposit two weeks after RSP is terminated. Otherwise, they are ineligible for on-campus housing unless vacancies occur. Unused valid RSP numbers are given to the students with the next higher RSP numbers until students report to the Halls for beginning of the semester.
2. All new freshmen, transfers and first time resident students shall pay by June 30 for fall

semester or until all allotted spaces have been assigned. These students pay by October 30 for spring semester.

3. If the student does not plan to utilize assigned on-campus housing, cancellation notice must be given (preferably in writing) to the Office of Housing and Residence Life according to the following schedule or the deposit is forfeited.

- (a) On or before July 17 for the fall semester.
- (b) On or before December 4 for the spring semester.

If housing is not available for the student, deposit will be returned if deposit was sent or made to the Housing Office. If the deposit was made or sent to the University Cashier, the student must apply to the Cashier's Office for a refund.

4. If the student utilizes campus housing, the housing deposit fee will be applied to their boarding and lodging account for the spring semester.

Charge Category—DAY STUDENT (Student Living Off Campus). **Payment—Each Semester.**

Residence Status—In-State—\$499.50. *Out-of-State—\$2,249.50.

Charge Category—BOARDING ONLY STUDENT (Student Living Off Campus but taking meals on campus). **Payment—Each Semester.**

Residence Status—In-State—\$1,014.50. *Out-of-State—\$2,764.50.

Charge Category—BOARDING AND LODGING STUDENT (Student Living On Campus. NOTE: All Dormitory Students must take meals in the University Dining Hall and participate in the student accident insurance program, however, the cost of this insurance is covered by our current lodging fee.

Payment—Each Semester. Residence Status—In-State—\$1,598.50. *Out-of-State—\$3,348.50

REGULAR SESSION CHARGES FOR PART-TIME STUDENTS NORTH CAROLINA STUDENT RATES

No. of Hrs.	Tuition	Other Required Fees	Total
1-5	\$ 54.00	\$ 60.75	\$114.75
6-8	108.00	161.75	269.75
9-11	162.00	283.50	445.50
12 or More	216.00	283.50	499.50

OUT-OF-STATE STUDENT RATES

No. of Hrs.	Tuition	Other Required Fees	Total
1-5	\$ 492.00	\$ 60.75	\$ 552.75
6-8	983.00	161.75	1,144.75
9-11	1,475.00	283.50	1,758.50
12 or More	1,966.00	283.50	2,249.50

(Boarding and Lodging Per
Semester)—\$1,099.00

INCIDENTAL FEES, DEPOSITS, AND CHARGES:

Accident Insurance (Optional)	\$32.00
Activity Sticker Replacement	
Fee Cost of Remaining Athletic Events	
Application fee (Non-Refundable) No	
Credit on Account	15.00
Bowling Course fee	11.00
Chemistry Laboratory	
Breakage Deposit (Refundable)	5.00
Cooperative Education Adm. fee	30.00
Diploma—Graduate	15.00
Diploma—Undergraduate	10.00
Identification Card Replacement	
fee	10.00
Key Replacement fee	10.00
Late Registration fee	20.00
Linen Deposit (Refundable)	10.00
Linen Fee	34.00
Master's Thesis Binding fee	20.00
Meal Card Replacement fee	10.00
Motor Vehicle Registration—Evening	
Student	7.50
Motor Vehicle Registration—Regular	
Student	15.00
Practice Teaching, Practicum,	
Internship	50.00
Regalia fee—Graduate	30.00
Regalia fee—Undergraduate	14.50
ROTC Uniform Deposit—	
Air Force (Refundable)	15.00
ROTC Uniform Deposit—	
Army (Refundable)	10.00
Room Deposit (Escrow)	75.00
Parking fee Violations	2.00-10.00
Transcript fee:1st Official Copy Free	
. 2.00 ea. Additional Copy	
USAID Sponsored Student Adm.	
fee	175.00
Per Semester	

AUDIT OF COURSES

Course auditing is available to any student upon payment of all applicable fees. Full-time students may audit courses without additional charges. Students auditing courses are not required to participate in class discussion, prepare assignments, or take examinations. COURSE AUDITING IS WITHOUT CREDIT.

REGISTRATION FOR THESIS ONLY WITH ZERO CREDIT

Students who have completed all of their course work and have already registered for the total number of credit hours provided for the thesis in a previous semester are required to register for "thesis only, with zero credit," if they need to be at the University to complete their thesis or to engage in a research project.

Tuition charge for the 1988-89 year for an in-state graduate student registered for thesis only with zero credit is \$99.00. The charge for an out-of-state graduate student is \$311.00.

Students are not permitted to use the facilities of the University without being officially registered.

REFUND POLICY

Refunds of tuition and related fees upon official withdrawal from the University will be made according to the following schedule:

IF WITHDRAWAL IS WITHIN THE FOLLOWING WEEKS OF OFFICIAL REGISTRATION DATE

1 Week	90%
2 Weeks	80%
3 Weeks	75%
4 Weeks	60%
5 Weeks	45%
6 Weeks	35%
7 Weeks	20%
8 Weeks	15%
After 8 Weeks	None

Room and Board—Pro-Rated for remaining days of the Semester.

WITHDRAWAL FROM COURSES

In order to receive financial credit for withdrawal from courses, a student must withdraw from course(s) within the official "add" period.

THE UNIVERSITY RESERVES THE RIGHT TO INCREASE OR DECREASE ALL FEES AND CHARGES, AS WELL AS ADD OR DELETE ITEMS OF EXPENSE WITHOUT ADVANCE NOTICE AS CIRCUMSTANCES, IN THE JUDGMENT OF THE ADMINISTRATION MAY REQUIRE.

SUMMER SCHOOL CHARGES PER CREDIT HOUR

UNDERGRADUATE—N. C. STUDENT

No. of Cr. Hrs.	Tuition	OTHER Required Fees	Total
1-5	\$ 54.00	\$31.85-\$54.75	\$ 85.85-\$ 108.75
6-8	108.00	60.10- 73.80	168.10- 181.80
9-11	162.00	79.15- 85.85	241.15- 247.85
12	216.00	89.20	305.20

UNDERGRADUATE—OUT-OF-STATE STUDENT

1-5	\$ 492.00	\$31.85-\$54.75	\$ 523.85-\$ 546.75
6-8	983.00	60.10- 73.80	1,043.10-1,056.80
9-11	1,475.00	79.15- 85.85	1,554.15-1,560.85
12	1,966.00	89.20	2,055.20

GRADUATE—N. C. STUDENT

1-2	\$ 54.00	\$31.85-\$37.20	\$ 85.85-\$ 91.20
3-5	108.00	42.55- 54.75	150.55- 162.75
6-8	162.00	60.10- 73.80	222.10- 235.80
9-11	216.00	79.15- 89.20	295.15- 305.20

GRADUATE—OUT-OF-STATE STUDENT

1-2	\$ 492.00	\$31.85-\$37.20	\$ 523.85-\$ 529.20
3-5	983.00	42.55- 54.75	1,025.55-1,037.75
6-8	1,475.00	60.10- 73.80	1,535.10-1,548.80
9-11	1,966.00	79.15- 89.20	2,045.15-2,055.20

Boarding and Lodging—(Gamble Hall) Per Week	\$61.75
Boarding and Lodging (All other Residence Halls) per Week	\$47.75
Linen Service—Per Week	\$2.00

DETAILS OF FEES, DEPOSITS, AND CHARGES

Required Fees— N.C. Student	Per Semester	Per Year
Tuition	\$ 216.00	\$ 432.00
Other Required Fees	283.50	567.00
Total—N.C. Day Student	\$ 499.50	\$ 999.00
Boarding and Lodging		
Board and Lodging	\$1,042.00	\$2,084.00
Reserve for Construction and/or Renovation of Dormitories	35.00	70.00

Linen Deposit (refundable)	5.00	10.00
Linen Fee	17.00	34.00
Total Boarding and Lodging		
Total—N.C. Boarding and Lodging Student	\$1,099.00	\$2,198.00
Out-of-State Student		
Tuition	\$1,966.00	\$3,932.00
Other Required Fees	283.50	567.00
Total—Out-of-State Student	\$2,249.50	\$4,499.00
Boarding and Lodging	1,099.00	2,198.00
Total—Out-of-State Boarding and Lodging	\$3,348.50	\$6,697.00

STUDENT FINANCIAL AID

Through the student financial aid program, the University makes every effort to assure that no qualified student will be denied the opportunity to attend because of a lack of funds. A student who demonstrates financial need and has the potential for success in the University may obtain assistance to meet their expenses depending upon funds available. Financial aid is awarded without regard to a student's race, religion, color, national origin, or sex.

The University provides financial aid for students from four basic sources: grants, scholarships, loans, and employment.

The University student aid funds are administered in conjunction with a nationally established policy and philosophy of financial aid for education. The basis of this philosophy is the belief that parents are the primary and responsible resource for helping to meet education costs and student financial aids are available for filling the gap between the student's resources and expenses.

The amount of the contribution expected from parents is related to consideration of a family's financial strength, net income, number of dependents, allowable expenses and indebtedness, and assets. Procedures established by a central needs analysis system and approved by the federal government are used in making this evaluation.

The University believes in the "packaging concept" of financial aid. Students with great need may expect assistance through a variety of sources which may include loans, employment, scholarship or grants.

Typical Sources of Financial Aid

Perkins Loan
Pell Grant
Supplemental Educational Opportunity Grant
College Work-Study Programs
State Tuition Scholarship
National Alumni Scholarship
Departmental Scholarships
Minority Presence Scholarship
Donated Scholarships
Institutional Scholarship Programs
Guaranteed Student Loan (PLUS) Parent Loans to Undergraduate Students
SLS (Supplemental Loan for Students—Independent)

A student who wishes to be considered for financial assistance must complete the following steps:

1. Submit a Financial Aid Form to the College Scholarship Service or Family Financial Statement to American College Testing.
2. Submit the Student Aid Report for the federal Pell Grant to the Student Financial Aid Office. Submit copies of Income Information

A student who completes the Financial Aid Form or Family Financial Statement will be considered for all financial assistance at the University for which he/she is eligible, including general scholarships, grants, loans, and employment.

Deadlines to have your completed application on file in the Student Financial Aid Office in order to receive consideration for assistance have been established as follows:

Fall Semester of any year:

May 15

Spring Semester of any year:

October 15

Summer School of any year:

April 15

Entering Students: A student entering the University as a freshman, transfer, graduate, or former student should apply for financial aid at the same time he/she applies for admission. A financial aid award will not be made until a student is admitted to the University, and it is

important that the admission procedure be completed as soon as possible.

Transfer and Graduate Students. A student who has previously attended another postsecondary school, college or university must submit a Financial Aid Transcript to document his/her financial aid status at the previous school. A separate transcript must be completed for each school previously attended.

Graduate Students. A graduate student who applies for financial aid is eligible to be considered only for loan assistance and for campus employment. Information about graduate assistantships may be obtained from the Graduate School Office.

All applicants must re-apply for financial assistance each academic year (or portion thereof) and separately for a summer session.

Information About Other Programs of Financial Aid

A student is encouraged to apply to sources outside as well as, inside the University for whatever assistance he/she may be eligible to receive. An award from outside sources must be reported to the Student Financial Aid Office so that it may be included as a part of the student's total aid. A student may be eligible for assistance from the following programs:

1. *North Carolina Student Incentive Grants.* Grant funds are available to North Carolina residents who are full-time, undergraduate students and who have substantial financial need. The NCSIG program is administered by College Foundation. Eligible students must complete Item 41 of the Financial Aid Form or Item 76 of the Family Financial Statement in order to apply for the NC Student Incentive Grant Program. The deadline is March 15.
2. *Vocational Rehabilitation.* Grants may be provided to needy students who are physically handicapped. A North Carolina student should contact the Vocational Rehabilitation Division of the Department of Human Resources in Raleigh.

3. *North Carolina Prospective Teachers' Scholarship-Loan.* The Department of Public Instruction in Raleigh administers a program of assistance to North Carolina students who plan a teaching career in the public schools of North Carolina.
4. *North Carolina Veterans' Scholarship.* The children of deceased or disabled veterans or of veterans who were listed as POW/MIA may be eligible for scholarships from the North Carolina Division of Veterans' Affairs, Raleigh.
5. *North Carolina Commission for the Blind.* Grants may be provided to needy students who are physically handicapped. A North Carolina student should contact the North Carolina Department of Human Resources, Division of Services for the Blind in Raleigh.
6. *North Carolina Medical Care Commission.* A student may obtain information about the program by writing to Department of Human Resources, Division of Facility Services, P.O. Box 12200, Raleigh, Raleigh, NC 27605.
7. *Cooperative Educational Program.* The Cooperative Education Program operates under two plans, Precooperative Education and Cooperative Education. After the freshman year, the student alternates semesters of full-time study with semesters of full-time related work experience. The students are paid by the sponsoring employer during the work experiences. Both plans are counseling-centered and the objectives are to enrich the total educational experiences of the students involved.
8. *ROTC Scholarships.* AFROTC/RAOTC Scholarships for four (4), three-and-a-half (3½), three (3), two-and-a-half (2½), and two (2) years may be available, based on Air Force/Army Officer accession needs, to men and women in selected engineering fields, selected scientific fields, selected non-technical academic majors, Navigator/Missile Launch Officer (for last 3H, 3 2½, or 2 years of a Bachelors Degree), pre-health professions (only for last 2 or 3 years of a Bachelors Degree), premedicine (Physician/Osteopath only), and nursing (only for last 2 years of a Bachelors Degree in Nursing).
9. *Minority Presence Grants.* Under the Board of Governors general Minority Presence Grant Program, white students may be eligible for special financial assistance if they are residents of North Carolina, enrolled for at least three hours of degree-credit coursework, and demonstrate financial need.
10. *The Quiester Craig Scholarship Fund.* An anonymous benefactor endowed this fund to provide academic scholarships for students majoring in Accounting. Named in honor of the School Dean, Dr. Quiester Craig, the recipients are determined by the Dean of the School of Business and Economics in consultation with the Chairman of the Accounting Department.
11. *The James A. Ruffin Memorial Award.* Established by his sister, Pauline R. Thornton, and identified with The Queens (Long Island) Alumni Association, Inc. of New York, this annual award of \$500 is restricted for a student from Eastern North Carolina. The award is based on need, academic average, and other eligibility criteria for a student majoring in Accounting or Business Administration.
12. *Special Engineering Grants and Scholarships.* Students admitted to Engineering Majors are reviewed as part of the admissions process for eligibility for several scholarship programs. Criteria include a high school record of distinction. These programs are supported by the National Action Council for Minorities in Engineering, Inc. (NACME), and R. J. Reynolds Company, and others. In addition, a variety of Corporations support scholarship and Co-op programs, internships, and summer employment opportunities for engineering students who have attained outstanding scholastic records during their freshman or sophomore years and who have met other program-specific criteria.
13. *American Indian Student Legislative Grant Program.* Students must be admitted or enrolled in a regular degree-granting program at the University; be classified as a North Carolina resident for tuition purposes; have financial need; be a member of an Indian tribe recognized by the state of North Carolina or by the Federal government. \$500 maximum per academic year for full-time undergraduate students and a reduced amount proportional to academic load for part-time students. Awards may be renewed annually, provided the student has need and remains in good standing academically. Applications are available in the Financial Aid Office.
14. *The Paul Douglas Teacher Scholarship Program.* Recipients must be a United States citizen admitted to enroll or enrolled in an eligible program leading to a degree. Students must have ranked in top 10% of the high school graduating class and have a cumulative GPA of 3.0 on a 4.0 grade scale. An outstanding record of leadership on service in extracurricular activities is a prerequisite. Student must express an interest in becoming a teacher at the pre-school, elementary, or secondary level, especially in North Carolina. Awards are valued at up to \$5,000 per year, but may not exceed the cost of education and must be reduced if other financial aid under Title IV of the Higher Education Act of 1965, as amended, is received. Subject to Congressional appropriations, the awards may be renewed, provided the recipient continues to meet the requirements of the scholarship. Applications may be obtained in the spring of each year from the office of the Dean of Education.

15. *The C.M. and M.D. Suther Scholarship Program:* The award is available to a full-time North Carolina resident undergraduate who has a financial need. The student must be enrolled. The scholarship can be made either to a freshman who was in the top 25% of his/her high school graduating class or to an upper-class student with an academic average of at least a B. Only one award is made each year, and is nonrenewable. The recipient is chosen by the financial aid Director.

16. *The North Carolina Teaching Fellows Scholarship Program:* Applicants are chosen on the basis of high school grades, class standing, SAT scores, writing samples, community service, extracurricular activities, and references from teachers and members of the community. Recipients must be accepted for admission to the University. Applicants are screened by two committees, one from the applicant's local school district, and the other from the educational region in which the applicant lives. Candidates recommended by the selection committees are interviewed by the Regional Screening Committees. Recipients of Teaching Fellows Awards are named in May of each year. Financial need is not a selection criterion. The amount of the award is \$5,000 per year and is renewable for four years of college. In addition, awards in the amount of \$4,000 are made to college juniors who are interested in preparing to teach in the public schools of the State.

Applications are available from the North Carolina Teaching Fellows Commission, 117 Glenwood Avenue, Raleigh, NC 27603 (919/832-1584).

17. *Ronald McNair Scholarships:* Ronald McNair Scholarships are offered to disadvantaged students entering the fields of physics or engineering. High school students are invited to apply for these scholarships as incoming freshmen with a deadline of April 1. Minimum

requirements for incoming freshmen will include:

1. High school grade point average (GPA) of 2.5 on a 4.0 scale.
2. Two letters of recommendation, one of which must be from a mathematics or science teacher.

Scholarships may be renewed each year if the following requirements are met:

1. A scholar must carry a minimum load of 12 credits per semester.
2. A scholar must maintain a 2.5 overall GPA.

Scholars may also be selected from majors enrolled in physics or engineering at North Carolina Agriculture and Technical State University. Minimum requirements for enrolled majors for selection as McNair Scholars will be:

1. A minimum load of 12 credits per semester.
2. A minimum GPA of 2.5.
3. Two letters of recommendation from North Carolina Agricultural and Technical State University faculty.

The selection of scholars will be handled by the College of Arts and Sciences for physics scholarships and by the School of Engineering for engineering scholarships.

18. *North Carolina Student Loan Program for Health, Science, and Mathematics:* Legal residents of North Carolina accepted as full-time students in accredited baccalaureate or master's programs leading to a degree are eligible for this program. Studies must be in Health (Allied Health, Health Sciences, Clinical Psychology, Medical Social Work), Mathematics (General, Pure and Applied Mathematics, Statistics, Actuarial Science), and Science (Agricultural Sciences, Renewable Natural Resources, Computer and Information Sciences, Engineering and Engineering Related Technologies, Life Sciences, Physical Sciences, Food Sciences and Human Nutrition, Dietetics/Human Nutritional Services).

Recipients are selected according to interests, academic capabilities, motivation and financial need. Maximum loans range from \$2,500 to \$6,000 a year depending on the degree level. Loans are renewable annually on satisfactory academic progress. Students should request information and applications between December 1 and April 1 from the North Carolina Student Loan program for Health, Science, and Mathematics, 116 West Jones Street, Raleigh, NC 27603-8003, (919/733-2164).

North Carolina Rehabilitation Corporation Student Loan Program

Loans under this program are available to needy and worthy North Carolina farm males/females who plan to study agriculture or home economics. The loans bear interest at the rate of (4%) percent per annum. Application forms and additional information may be obtained from North Carolina Rural Rehabilitation Corporation, P.O. Box 2403, Raleigh, NC.

Satisfactory Academic Progress

The Higher Education Act requires that a student must be maintaining satisfactory academic progress in a course of study leading towards a degree in order to be eligible for financial assistance.

To be considered making satisfactory academic progress, a *full-time* student must have declared a major course of study, leading towards a degree by the end of the third (3rd) semester. The following minimum grade point average and semester hours passed at the BEGINNING of the semester indicated must be:

Semester Hours	Cumulative Grade Point Average	Average Hours
3	1.2	24
5	1.4	48
7	1.7	72
9	1.9	96

A *part-time* undergraduate student enrolled in a degree program must maintain the following minimum cumulative grade point average at the *END* of the cumulative semester hours indicated:

Semester Hours	Cumulative Grade Point Average
24	1.2
48	1.4
72	1.7
96	1.9

A part-time undergraduate student is defined as one who enrolls in less than twelve (12) hours during a semester.

Full-time and part-time students who enroll in the University after an academic suspension must achieve a minimum semester grade point average of 2.0 in order to be considered for financial aid.

Failure to meet the minimum academic requirements given above renders the student ineligible to receive financial assistance and subject to immediate academic suspension. A student who is suspended for a given semester is not eligible to receive any financial assistance until the student has been reinstated to a satisfactory academic progress level.

Beginning with the 1987-88 award year, students who have not received Title IV assistance in previous award years must have a cumulative grade point average of 2.0 ("C") and completed at least 48 hours at the end of four (4) semesters. This requirement may be waived if the student has undergone undue hardship because of death of a relative of the student, an injury or illness of the student, or other special circumstances as determined by the Financial Aid Administrator. Students must provide documentation to support the waiver.

Effective Fall 1988 for the entering class, a student must complete the minimum required number of credit hours per semester of attendance and have an overall grade point average of no less than 2.0, before he or she is certified to receive a Guaranteed Student Loan. Those students who are borderline (1.9 GPA) will be able to submit a letter of appeal for re-consideration

based on documented individual undue hardship.

ADMISSIONS

POLICY

North Carolina Agricultural and Technical State University is an equal opportunity institution committed to the principle that access to study be afforded on the basis of individual merit and without regard to race, religion, national origin or handicap. Unless otherwise specified, admission to all undergraduate curricula are under the jurisdiction of the Director of Admissions.



PROCEDURES

Submission of Application

Inquiries on and applications for admissions should be made to the Office of Admissions, North Carolina Agricultural and Technical State University, Greensboro, North Carolina 27411. A non-refundable fee of \$15.00 is required with each application.

Application Deadline

The recommended deadlines for submitting the application for admission is June 1 for the Fall Semester and December 1 for the Spring Semester. Applications received after these dates will be honored on a day-to-day basis as long as classroom space is available. Applications for early decision must be received by November 1 prior to Fall Semester of intended enrollment. In all cases, early application is encouraged because class space and housing facilities dictate to some extent the number of new students that can be admitted for each semester.

International students on non-immigrant VISA's are required to submit the application by May 1 for Fall Semester and November 1 for the Spring Semester.

Supporting Documentation

1. To be considered official, all transcripts from high school and/or college must be sent directly to the Office of Admissions from the sending institutions.
2. SAT or ACT scores, when applicable, must be official and reports sent directly from the testing agency. The University's CEEB code for the SAT report is 5003; the code for the ACT report is 3060.
3. The submission of a final or complete transcript from the last school attended is the responsibility of the student. Thus, the University reserves the right to withdraw any offer of admission if the applicant fails to satisfy all requirements

prior to the closing of the first semester of enrollment.

Notice of Admission and Confirmation

The University practices "rolling admission"; therefore, decisions are made as soon as a file is complete. Early decision notices are mailed between December 1 and December 15. Candidates who are offered admission must notify the University of their intent to enroll by January 15. Students approved for admissions are forwarded a letter of acceptance and a permit to register. The candidate reply date of May 1 for freshmen student for each fall term is honored by the University. Transfer students should confirm within two weeks of the receipt of the admission letter. Failure to comply will affect adversely the candidate's reserved space. Persons who are not approved for admission are also be notified in normal fashion.

ADMISSIONS CRITERIA

Freshman Applicant

An applicant for admission is considered individually, in accordance with the following criteria:

1. Evidence of academic achievement and promise with considerable facility in the use of the English language and with an understanding of the fundamental mathematical processes.
2. Complete record from an accredited secondary or preparatory school with graduation based on no fewer than 16 units (see subject matter requirements in next section).
3. Satisfactory scores on the Scholastic Aptitude Test or the American College Test.
4. Satisfactory class rank or grade point average.

These criteria and those which follow are applied flexibly to assure that people with unusual qualification are not rejected in the admissions process.

Minimum Undergraduate Admissions Requirements for Fall '89 and Spring '90 Semesters

For admission to all undergraduate programs, the applicant must present sixteen (16) units of high school credit in the following academic fields.

English 4 units
Mathematics 2 units (1)
Social Sciences 2 units (2)
Laboratory Science ... 2 units (3)
Electives 6 units (4)

- (1) All students must present Algebra I and Geometry. Students planning majors in the School of Business and Economics, and science curricula in the College of Arts and Sciences, must present 3 academic units—2 units of Algebra, $\frac{1}{2}$ unit of plane Geometry and $\frac{1}{2}$ unit of Trigonometry. Students planning to major in Engineering, Mathematics or Physics, must present $3\frac{1}{2}$ academic units—2 units of Algebra, 1 unit of plane Geometry and $\frac{1}{2}$ unit of Trigonometry.
- (2) United States History is required.
- (3) Biology, Chemistry, Physics or Earth Science (ESCP) are options.
- (4) No more than 3 units in vocational subjects and 2 units in the disciplines of Music and Physical Education. Courses in Foreign Language are highly recommended.

In addition to the above listed criteria, the standards governing admission to the School of Nursing are as follows:

- 1) a combined Scholastic Aptitude Test score of 750 or higher, or
- 2) a cumulative grade point average of "B" or better.

Conditionally admitted students may be required to take special non-credit courses to remove deficiencies and such courses must begin immediately upon enrollment in the first year of study and subsequent enrollments scheduled for each semester as required until the deficiency has been satisfied.

Minimum Admission Requirements at the 16 Campuses of The University of North Carolina*

High school graduates from the classes of 1988 and 1989, who *otherwise meet the institution's own admissions requirements* may be admitted, provided they have successfully completed in grades 9-12:

In English, four course units emphasizing grammar, composition and literature;

In mathematics, two course units including algebra I and one additional course unit;

In science, two course units including one physical science and one biological science; and

In social studies, two course units including one unit in U.S. History, but an applicant who does not have the unit in U.S. history may be admitted on the condition that at least three semester hours in that subject will be passed by the end of the sophomore year.

For the class of 1990 and beyond, the following courses will be required for admission, in addition to an institution's own specific requirements:

In English, four course units emphasizing grammar, composition and literature;

In mathematics, three course units including algebra I, algebra II, and geometry, or a higher level mathematics course for which algebra II is a prerequisite;

In science, three course units including

- at least one unit in a life or biological science (for example, biology)

- at least one unit in a physical science (for example, physical science, chemistry, physics), and

- at least one laboratory course; and

In social studies, two course units including one unit in U.S. history.

In addition, it is recommended that prospective students:

- complete at least two course units in one foreign language, and take one foreign language course unit and one mathematics course unit in the twelfth grade.

For specific requirements, students should refer to the respective schools/college section and to departmental listings in this bulletin. In addition, it is recommended that prospective students

- complete at least two (2) course units in one (1) foreign language, and

- take one (1) foreign language course unit and one (1) mathematics course unit in the twelfth grade.

THE UNIVERSITY OF NORTH CAROLINA*

Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina A&T State University, North Carolina Central University, North Carolina School of the Arts, North Carolina State University at Raleigh, Pembroke State University, University of North Carolina at Asheville, University of North Carolina at Chapel Hill, University of North Carolina at Charlotte, University of North Carolina at Greensboro, University of North Carolina at Wilmington, Western Carolina University, Winston-Salem State University.

Transfer Students

The University accepts qualified students by transfer from other accredited colleges. Applications for admission may be considered if the transfer student:

- 1) is not presently on social or academic probation at the last or current school of attendance.
- 2) has a cumulative average of at least a "C" in the institution from which transferring and is eligible to return to that institution.
- 3) has not been suspended or dropped from another institution.

Transfer students who have attended another accredited college but have earned less than thirty (30) semester hours of acceptable credit or equivalent must meet all freshman requirements.

Applications from transfer students cannot be considered until all credentials are received from the high school and all other institutions previously attended. In addition, there must be a statement of good standing and honorable dismissal from these institutions. Previous college records must show a cumulative average of "C" or above. No course is accepted in transfer in which a grade below "C" was originally earned.

Accepted courses are recorded to the student's credit, but grade points are not calculated on the transferred courses.

Transfer applicants who are not covered by the above stated policy are referred to the next section on special students.

Special Students

Special students are those who are not candidates for degree at the present time. This category includes 1) non-degree seeking nontraditional students (age 25 and over), 2) visiting students, 3) high school enrichment students and 4) persons who have not enrolled for one academic year and are ineligible for admissions as a transfer student. The University welcomes into this admission status enrollment of persons who are pursuing degrees elsewhere, who possess a baccalaureate degree, or who desire to earn prerequisites for graduate work. Such students may register upon the presentation of a signed statement from the appropriate official of his institution or certifying agency specifically listing and approving the courses to be taken. Such enrollment does not constitute regular admission to the University. To apply for this category of admissions, the applicant must submit the application form for admissions with fee and provide supporting documentation as appropriate. Transcripts from all colleges and universities attended are required if the applicant plans to enter degree-seeking status at a later date. Visiting students must submit a transient course study form from the home institution that has been approved by the department chairperson, school or college dean and the University Registrar. All others must provide evidence of readiness to pursue the courses desired and a statement of objective and purpose related to the request for special student admission.

Such persons may register for no more than 12 semester hours per academic term and may remain in this category until they have attempted a total of 24 semester hours.

After completing one semester of full-time study, or its equivalent, the unclassified student may petition the University's Admission and Retention Committee to be admitted to the University as a regular degree candidate on the basis of their academic accomplishments. All communications must be written and sent to the committee in care of the Director of Admissions.

International Students

North Carolina Agricultural and Technical State University welcomes and accepts application from qualified students who are not United States citizens. Such students must meet each of the following criteria:

- 1) Satisfy all requirements governing admissions for the School to which the application is made. The expected program of study from their feeder school should be university preparatory and the leaving school certificate marks must support academic promise.
- 2) Show proficiency in written and oral English usage. If English is not the first language of communication, the Test of English as a Foreign Language (TOEFL) is required and a satisfactory level of English Proficiency on both the total and part scores are required.
- 3) Can conform to all contract regulations of the United States Immigration and Naturalization Service and be eligible for F-1 Student Status as a freshman or transfer from another school.

The I-20, Certificate of Eligibility, will be prepared for all new international students who are admitted to the University and who have official documentation on file attesting to their ability to meet their school fees. The University has no financial aid for international students and

permission to work is not usually granted by INS.

OTHER POLICIES AND PROCEDURES

Filing of Credentials

Applicants should take the proper steps to see that their credentials (transcripts, etc.), are sent to the Director of Admissions as early as possible, preferably not less than thirty (30) days before the beginning of the semester in which they plan to enroll.

Interviews and Campus Visits

Interviews are not required for admission, however, persons with unusual circumstances are welcome to schedule appointments to discuss these matters with an Admissions Counselor or the Director of Admissions. Campus visits are encouraged and campus tours are routinely given. Reservations for the tour are highly recommended.

Orientation, Registration and the Opening of the Semester

All newly admitted students are expected to attend Orientation and freshman students living on-campus must arrive the day preceeding freshman Orientation program (See University Calendar). Orientation for transfer and special students is scheduled for the day preceding registration. Placement testing is required of all freshmen in Mathematics, English and Reading. These tests are designed as aids for academic advising and scheduling and students who fail to show proficiency in these academic areas will be assigned remedial course work. Transfer students for programs in Engineering, Mathematics, Computer Science, Animal and Plant Science, Chemistry, Physics and Biology are required to take a special mathematics test.

Permission to Take Courses Elsewhere

North Carolina Agricultural and Technical State University degree seeking students who desire to take courses elsewhere, i.e., Summer, Fall, or Spring, are required to obtain approval from their school/-college dean before registering at another institution. Course descriptions are needed in order for accurate evaluations to be done. The maximum number of transferable credits is 80 semester hours (4 year programs) and course credit must be the same as that of the course at A&T. Only the credit hours will transfer to A&T and a minimum grade of "C" is required for a course to transfer. Transient Study Forms and Guidelines for off-campus study are available in the Office of Admissions.

Regulations for Veterans and Children of Deceased and Disabled Veterans

Veterans and children of deceased and disabled veterans must meet regular admission requirements. Preliminary application for any educational benefits due them should be made to the nearest regional office of the Veterans Administration well in advance of the desired admission date in order that the necessary information and documents may be obtained.

Graduate Applicants

Graduate School admission is under the supervision of the Dean of the Graduate School, North Carolina A&T State University, Greensboro, North Carolina 27411. Information concerning admission to the Graduate Degree Programs can be found on page 151 of this Bulletin.

Continuing Education Applicants

Summer session, the evening and weekend college and continuing education, off-campus and non-

credit courses, are under the supervision of the Assistant Vice Chancellor for Academic Affairs. Information concerning admission and/or enrollment should be directed to that office. The address is:

100 Dudley Building
North Carolina A&T State University
Greensboro, NC 27411

Generally admission requirements for continuing education classes are the same as those for comparable work in regular classes on campus. However, the persons may enroll without being admitted for non-credit courses and programs not applicable to a University degree. A continuing education applicant is usually one of matured years, with special training along particular lines or of long experience in special fields of knowledge, thus such a person can be either a degree or unclassified applicant. Continuing education enrollees who have taken compatible courses for credit may later choose to change their status to degree seeking. At the time of application for admission to degree status, the continuing education applicant is required to satisfy the standard admission policies.

RESIDENCE STATUS FOR TUITION PAYMENT

Residence classification for tuition purposes are set forth by law in North Carolina as follows:

G.S. 116-143.1—(The controlling North Carolina Statute) "To qualify as a resident for tuition purposes, a person must have established legal residence (domicile) in North Carolina and maintained that legal residence for at least 12 months immediately prior to his or her classification as a resident for tuition purposes." This Statute also sets forth statutory definitions, rules, and special provisions for determining resident status for tuition purposes. These provisions include special rules with respect to persons who are married or who are within identified subclasses of minors.

University regulations concerning the classification of students by residence, for purposes of applicable tuition differentials, are set forth in detail in *A Manual To Assist The Public Higher Education Institution of North Carolina in the Matter of Student Residence Classification for Tuition Purposes*. Each student is responsible for knowing the contents

of that Manual, which is the controlling administrative statement of policy on this subject. Copies of the Manual are available for student use in the Office of the Assistant Vice Chancellor for Student Affairs (Murphy Hall) at North Carolina A. and T. State University.

Academic Information and Regulations

Each student is responsible for informing himself or herself of the academic regulations and requirements set forth in this Bulletin and for revisions of same as posted on campus bulletin boards or released in other official publications of the University. Failure to meet the requirements or comply with regulations because of lack of knowledge thereof does not excuse the student from meeting the academic regulations and requirements.

A student's program of study must be approved by his or her advisor, his or her chairperson or a member of the faculty in his or her major department at registration. Advisors will make every attempt to give effective guidance to students in academic matters and to refer students to those qualified to help them in other matters. However, the final responsibility for meeting all academic requirements for a selected program rests with the student.

ADVANCED PLACEMENT

Students entering the University from secondary school may obtain advanced placement and college credit on the basis of performance on the College Entrance Examination Board Advanced Placement examinations. A score of 3 or higher on any CEEB advanced placement examination will entitle the student to credit for the comparable University course as determined by the



Director of Admissions in consultation with the Chairperson of the appropriate department.

COURSES OF STUDY

Students should refer to the requirements of their respective departments and schools about their programs of study and confer with their advisor whenever problems arise. The student is expected to follow the program outlined as close as possible. This is very important during the first two years when he or she is satisfying basic degree requirements and prerequisites for advanced work.

PREREGISTRATION

Preregistration is a time designated each semester to allow the student and his or her advisor to review the student's records and plan a program for the next semester.

The student has an opportunity to discuss academic problems with the advisor. Preregistration helps to ensure that the courses requested on the preregistered schedule will be available to the students the following semester.

Students who are enrolled in the University during the preregistration period are expected to preregister during the period designated for this purpose.

OFFICIAL REGISTRATION

In order for a student to get credit for a course, he or she must be properly registered in that course. This means that the student must have gone through the registration procedures as outlined by the University. Further, the student must have filed with the office of the Registrar the required class schedule and paid all required tuition and fees.

LATE REGISTRATION

Students are expected to complete enrollment (including the payment

of all required fees) on the dates listed on the University Calendar. The payment of fees is part of the registration process. No student is eligible to attend classes until the required fees have been paid.

Students who fail to complete registration during the scheduled dates will be required to pay a late registration fee of \$20.00.

AUDITORS

Regular students may audit a course upon the written approval of the instructor and his or her faculty advisor. They must register officially for the course and pay an audit fee to the University Cashier.

Attendance, preparation, and participation in the classroom discussion and laboratory exercises shall be at the discretion of the instructor.

Auditors are not required to take examinations and tests and they receive no credit. An auditor may not change his or her registration from audit to credit or from credit to audit after the date for dropping courses shown in the University Calendar.

COURSE LOAD

The normal course load is 15 or 16 semester credit hours. An undergraduate student must carry a minimum of twelve semester credit hours in order to be fulltime.

The maximum course load that a student may carry at the University is eighteen credit hours, unless the student has a cumulative grade point average of 3.0 or higher or has a 3.2 semester average in twelve or more hours the immediate past semester.

The maximum course load that a student may carry who has a cumulative grade point average of 3.0 or higher is twenty-one hours.

The maximum course load that a student may carry who is on academic probation is twelve semester hours.

Undergraduate students on academic probation who have a cumulative grade point average at or above the minimum level that is required based on the number of semesters completed are exempted

from the twelve hour course load limit.

DOUBLE MAJOR

Students who desire to obtain a double major, involving two departments or two schools must satisfy the major requirements for each department or school.

PREREQUISITES

A course which is designated as prerequisite to another course indicates that the prerequisite is required before taking the next course.

Credit may be granted to indicate acceptable performance in the prerequisite course content by successful completion of standardized tests under the College Level Examination Program (CLEP) or successfully passing an examination adopted or prepared by the department granting the credit.

REPETITION OF COURSES

A student who has received a failing grade in a required course at this University must repeat and pass the course unless the dean of the School authorizes a substitute course. In cases where a student earns a "D" in his major field and is required to repeat the course the "D" is treated in the same manner as an "F". This is, the "D" is dropped in the computation of the GPA for the purpose of meeting graduation requirements in his major field.

When a course is repeated and passed, other than independent study courses which usually carry the same numbers and may be taken several times, the highest grade will be used to meet the course and degree requirements.

A student who is taking a course as an elective or out of his or her major field is not held to the prerequisite provision. However, permission of the instructor of the course or the student's department chairperson is required.

A student who has received a passing grade in any course at this University may repeat the course

for credit at his or her option. Again, when this is done *only* the higher grade will count towards meeting course and degree requirements. *Dual course credit is not allowed.* This is to say that only three (3) hours of credit are allowed for a three (3) hour course regardless of the number of times it is repeated.

All grades earned by the student including "F's" are a part of his or her official academic record and will appear on his or her transcript.

CORE REQUIREMENTS OF THE UNIVERSITY

The University has approved the principle of greater flexibility in the course offerings that can be taken to satisfy the core requirements of the University. The areas in the core and the minimum semester hour requirements are as follows:

Areas	Minimum Number of Semester Hours Required	Suggested Courses
English	6	*English 100, 101
Social Science	6	History 100, 101
Natural Science	6	Biological Science 100 Physical Science 100 Botany 140 Zoology 160 Chemistry 101, 102
Humanities	6	Humanities 200, 201
Mathematics	6	Mathematics 101, 102
Health or Physical Education	2	

* Five year program

* Required course

SKILLS DEVELOPMENT PROGRAM

See Learning Assistance Center page 150.

COURSE CREDIT BY EXAMINATION

Credit may be earned by examination for any undergraduate course for which a suitable examination has been adopted or prepared by the department granting the credit. The student receives the grade "P" and regular credit for the number of hours involved. However, the credit hours are excluded in computing the student's grade point average.

Credit may also be granted for the successful completion of standardized tests under the College Level Examination Program (CLEP), as approved for specific courses by University departments. There is no maximum amount of credit that a student may earn, but a student must complete a minimum of three semesters as a full-time student in residence at the University. Fees for CLEP and other standardized examinations are determined externally, rather than by the University. These credits are treated as transfer credits. Questions about the program may be addressed to the Director of Admissions, or the Director of Counseling Services.

(Grading System)

Grades are assigned and recorded as follows:

Grade	Description	Grade Points
A	Excellent	4
B	Good	3
C	Average	2
D	Below Average, but passing	1
F	Failure	0
I	Incomplete	
P	Satisfactory (credit by examination)	
S	Satisfactory (non-credit courses)	
U	Unsatisfactory (non-credit courses)	
V	Audit	
W	Withdraw	

ACADEMIC RETENTION

The normal load for an undergraduate student is sixteen (16) credit hours per semester. The minimum load for a full-time undergraduate student is twelve (12) credit hours per semester. The student is expected to make normal progress toward a degree. Generally, normal progress means the completion of twelve or more semester hours each semester with a 2.0 grade point average or higher for full-time students.

To be in good academic standing a full-time student must have the following minimum grade point average and the following semester hours passed at the beginning of the semester indicated:

To Enter the Semester Indicated	Over-all GPA	Hours Passed*
Third	1.2	24
Fifth	1.4	48
Seventh	1.7	72
Ninth	1.9	96

* A student is eligible to register if he or she has a minimum overall grade point average of 2.0 and has attended the University less than the maximum number of semesters allowed for the degree program.



A student must achieve a minimum semester grade point average of 2.0 each semester enrolled beyond the eighth (8th) semester to be in good academic standing. A student is eligible to continue to work toward an undergraduate degree until he has attended eleven (11) semesters as a full-time student (not including summer session) or until he has attempted 170 semester hours, whichever comes first. If a student is in a five year degree program that student has a maximum of thirteen semesters to complete all degree requirements or may attempt a maximum of 194 hours whichever comes first.

The student should be aware of his or her academic status each semester. Failure to meet the minimum academic requirements given above makes the student eligible for immediate suspension. A student who is suspended for a given semester may apply for re-admission for the next semester. The application for readmission should reach the Office of Registrar 30 days prior to the beginning of the semester that the student wishes to re-enroll. Upon enrolling, the student is required to achieve a minimum semester grade point average of 2.0. No student will be suspended for the second time if he earns a minimum

grade point average of 2.0 for the current semester. The student who fails to meet the minimum academic requirements after having been suspended and re-admitted is subject to permanent academic dismissal, subject to the provisions of the academic appeal procedure.

A part-time undergraduate student enrolled in a degree program must maintain the following minimum cumulative grade point average at the end of the cumulative semester hours indicated:

SEMESTER HOURS	GRADE POINT AVERAGE
24	1.2
48	1.4
72	1.7
96	1.9

A part-time undergraduate student is defined as one who enrolls in less than twelve (12) hours during a semester. The part-time student who fails to maintain the minimum average is subject to the actions prescribed for full-time students. A part-time student who enrolls in the university after an academic suspension must achieve a minimum semester grade point average of 2.0.

VETERANS AND PERSONS ELIGIBLE FOR VETERANS BENEFITS

Veterans will be certified for the length of their program. Thereafter, certification will be made on a semester basis contingent upon their potential for completion of their program within a reasonable time. This might be determined by university counseling.

After eight semesters the student must maintain a minimum grade points average of 1.90. To graduate, however, the student must complete a minimum of 124 semester hours with a grade point average of 2.0.

Veterans will be certified annually for the length of their program. Thereafter, certification will be made on a semester basis, contingent upon their potential for graduation within a reasonable time, as determined by University counseling.

ACADEMIC DISMISSAL APPEALS

Any student who has been dismissed from the University must be out for a minimum of one semester before an appeal may be made to the Committee on Admission and Academic Retention. Appeals are to be addressed to the Committee on Admission and Academic Retention in care of the Office of the Vice Chancellor for Academic Affairs.

GRADE POINTS

Grade points are computed by multiplying the number of semester hour credits by 4 for courses in which a grade of A is earned; by 3 for a grade of B; by 2 for a grade of C; by 1 for a grade of D. No grade points are given for a grade of F.

GRADE POINT RATIO

The grade point ratio is obtained by dividing the total number of grade points earned by the total number of semester hours attempted.

COURSE NUMBER AND CLASSIFICATION

Each course bears a distinguishing number which identifies it within the department and indicates, broadly, its level. The numbering system is as follows:

- 100-399, lower level courses primarily for freshmen and sophomores
- 400-599, upper level courses primarily for juniors and seniors
- 600-699, courses for undergraduate and graduate students
- 700-799, courses for graduate students and appropriate professional students
- special programs.

CLASSIFICATION OF STUDENTS

Students are classified on the basis of semester hours completed, excluding remedial and deficiency courses. The following classification scale applies to all students enrolled in a four (4) year program:

CLASSIFICATION	SEMESTER HOURS COMPLETED
Freshman	0-32
Sophomore	33-63
Junior	64-95
Senior	96 or above

The following classification scale applies to students enrolled in a five year program:

CLASSIFICATION	SEMESTER HOURS COMPLETED
Freshman	0-33
Sophomore	34-67
Lower Junior	68-100
Upper Junior	101-133
Senior	134 or above

CHANGE OF GRADE

A request for a change of grade, for any reason, must be made within one year following the date the original grade was assigned by the faculty member.

CHANGES IN SCHEDULE

A change in a student's program may be made with the consent of his or her advisor or department chairperson. However, if a student's schedule is changed after the designated period for adding and/or dropping courses, the consent of the School Dean is required.

The student must obtain and properly execute the Change of Schedule Form. This form is obtained from the Office of The Registrar and should be returned to that office.

CHANGING SCHOOLS

Students may transfer from one School of the University to another with the written approval and

acceptance of the Deans of the Schools involved. The proper forms on which to apply for such a change are to be obtained from the Office of the Registrar and executed at least six weeks prior to the beginning of the semester in which the student plans to transfer. When such a transfer is made the student must satisfy the current academic requirements of the school and/or department to which the student transfers.

WITHDRAWAL FROM THE UNIVERSITY

A student who wishes, or is asked to leave the University at any time during the semester shall execute and file official withdrawal forms. These forms may be obtained from the University Counseling and Testing Center. They should be completed and submitted to the Office of The Registrar. A "W" will be given once the student has officially withdrawn. Failure to execute and file these forms in a timely manner will result in a student incurring the penalty of receiving an "F" for each course in which he or she was enrolled during the semester in question.

Students who withdraw from the University within 15 calendar days of the beginning of the final examination period for the semester shall receive grades based upon their performance in classes up to the date of their withdrawal.

Re-Admission of Former Students

All students who withdraw from the University, voluntarily leave the University or are suspended, must obtain a permit to register before resuming their studies at the University.

The request for a permit must be received by the Office of The Registrar at least thirty (30) days prior to the beginning of the semester in which the student plans to register. When requesting a permit, the student should include his or her student number, major, last term in attendance and permanent address.

Before a student is re-admitted, who voluntarily leaves or withdraws, his or her academic record is

reviewed. If the student did not attain the minimum academic performance level for the number of semesters enrolled at the University, the request for readmission is subject to be denied.

Former students who have been dismissed from the University for failure to meet the scholastic eligibility requirements may appeal to the Committee on Admissions and Retention for a review of their case. The appeal should be addressed to the Committee in care of the Vice Chancellor for Academic Affairs.

The persons should not present themselves for re-enrollment until they have received a reply from the Committee. Appeals should reach the Committee at least sixty (60) days prior to the beginning of the term in which the persons expect to register.

Former students whose attendance has been interrupted by the University for disciplinary reasons must apply to the Vice Chancellor for Student Affairs for a review of their case for possible re-admission.

INCOMPLETES

Students are expected to complete all requirements of a particular course during the semester in which they are registered. However, if at the end of the semester, a small portion of the work remains unfinished and should be deferred because of some serious circumstances beyond the control of the student, an "I" may be submitted.

An "I" for a prolonged illness may be submitted only after the written approval of the Vice Chancellor for Student Affairs has been secured. An "I" for other causes may be submitted only with the approval of the Dean of the School.

Along with the recording of the incomplete grade, the instructor must also file with the head of the department, the student's average grade and a written description of the work which must be completed before the incomplete is removed.

(Procedure for the Removal of an Incomplete)

An incomplete grade must be removed within SIX WEEKS after the beginning of the next semester.

If the student has not removed the incomplete within the time specified, the instructor is required to submit the appropriate final grade. Developmental, thesis and research courses are exempted from this six week time limit.

SEMESTER EXAMINATIONS

A final examination will be required as a part of every course. An examination schedule showing time and place of meeting of each course and section will be published each semester. Schedules so published will be followed without exception. Any changes in the examination schedule must be approved by the Office of Academic Affairs.

HONOR ROLL

To encourage scholarship, the University publishes an Honor Roll at the end of each semester. Regular undergraduate students whose grade point average is 3.00 or higher shall be eligible for the Honor Roll. All hours attempted are included in the grade point average computation for honors.

CLASS ATTENDANCE POLICY

Regular and punctual class attendance is the responsibility of the individual student. Moreover, the student is expected to have sufficient maturity to assume the responsibility for regular attendance and to accept the consequences of failure to attend.

The non-compulsory class attendance policy places responsibility on the student and the instructor.

Student's Responsibility

1. The student is responsible for all material covered in each course for which he or she is registered. Absence from class does not relieve him or her of this responsibility.
2. The student is expected to be present for laboratory periods, scheduled examinations, and other activities that may require special preparation.

3. The student is responsible for initiating any request to make up an examination, a laboratory exercise or other work missed because of a class absence. If the instructor requests a statement concerning the reason for the absence, the student should obtain it from the appropriate officer (e.g., the University Physician, the Vice Chancellor for Student Affairs.)
4. The student is expected to report to each class at the beginning of the term with a validated schedule and a class admission card.

Instructor's Responsibility

1. The instructor is responsible for explaining to the class any specific expectations concerning attendance at the beginning of the term.
2. The instructor is responsible for providing the student with a schedule of the examinations and other class requirements that will provide a basis of evaluating student performance.
3. The instructor is responsible for maintaining a record of the attendance of the students in his or her class.
4. The instructor is expected to warn the student when his or her academic progress is adversely affected by excessive absence from class.

Policy on Make Up of Required Course Work

The administration, faculty and staff recognize that there are circumstances and events which required students to miss classes and require course work which may be performed or due on the day of the absence. Also, they recognize that required course work is needed to give each student an adequate performance evaluation. Therefore, whenever reasonable (and more specifically described below), students should be allowed to make up required work.

The following definitions will apply with respect to this policy:

(a) Required course work—All work which will be used in the determination of final grades; e.g.

examinations, announced quizzes, required papers and essays, required assignments.

(b) Instructor—Person responsible for the course and providing instruction and evaluation.

(c) Permissible reasons for requesting make up of required work—Sickness (verification needed); death of relatives (immediate family); participation in approved University related activities; acting in the capacity of a representative of the University (band, choir, sports related travel, etc.); extraordinary circumstances (court appearance, family emergency, etc.); require a signed statement. NOTE: Other reasons for requesting make up of required course work are not acceptable.

INSTRUCTORS SHOULD SCHEDULE MAKE UP WORK AT A TIME THAT IS CONVENIENT TO BOTH THE INSTRUCTOR AND THE STUDENT.

(d) Documentation—Verification of sickness requires signed statement of a physician or a duly authorized staff member of the Health Center.

Verification of death requires signed statement from the Minister or Funeral director.

Verification of participation in University related activities requires signed statement from the Office of the Vice Chancellor for Academic Affairs.

Verification of other reasonable circumstances (for example: court appearance, family emergency, etc.) requires a signed statement from an appropriate official (e.g., Court Official, parent or guardian, etc.)

The policy regarding make-up of required course work is as follows:

- (1) A student may petition an instructor to make up required course work whenever the student has a permissible reason for requesting make up of required course work.
- (2) Student will be required to present documentation which verifies absence constituting permissible reason.
- (3) Whenever possible, a student should consult with the instructor prior to an absence which will involve the failure to do

required course work. Arrangements for make up should be discussed and agreed upon at this time.

- (4) A student must petition for make up of required course work within three (3) days of the date the work was missed, unless extenuating circumstances—which must be justified—exist.
- (5) If permission is granted to make up required course work, the instructor and the student should agree on an acceptable date for accomplishing the make up of missed required course work.
- (6) Failure to comply with item 4 may result in the denial to make up required course work.

GENERAL REQUIREMENTS FOR GRADUATION

A candidate for a degree from North Carolina Agricultural and Technical State University must satisfy the following minimum requirements:

1. Choose a specific curriculum leading to a degree in one of the schools and complete the requirements of this curriculum.
2. Complete a minimum of 124 semester hours excluding deficiency courses and remedial work for the Bachelor's degree.
3. Complete the core requirements of the University in English, Mathematics, Natural Science, Social Science, Humanities and Health or Physical Education for the Bachelor's degree.
4. Earn an average of two (2) grade points for every semester hour undertaken including hours passed or failed. After completing the number of credit hours required for graduation, if the student is deficient in grade points, he or she must take additional courses that have been approved by his or her academic dean to secure these points. The student must also obtain an average of 2.0 or more in his or her major field.
5. Complete a minimum of three semesters as a full-time student

in residence at the University. This requirement includes the two semesters prior to the period when the student completes his or her requirements for graduation. At least one-half of the credits in the student's major field must be earned at the University.

Exception to either of these provisions may be made upon the recommendation of the Chairperson of the student's major department with the approval of the School Dean.

6. Clear all academic conditions by the end of the semester preceding graduation.
7. Pay all University bills and fees.
8. File an application for graduation with the Office of The Registrar in accordance with the schedule below:
 - A. May Graduation—By last day for late registration for spring semester
 - B. Summer Graduation—By the end of the second week of class in the summer session
 - C. December Graduation—By the last day for the late registration for the Fall Semester

GRADUATION WITH HONORS

Graduation honors are awarded undergraduate candidates who complete all requirements for graduation in accordance with the following stipulations: (1) Those who maintain a general average within the range of 3.00 to 3.24 will receive CUM LAUDE, (2) those who maintain a general average within the range from 3.25 to 3.49 will receive MAGNA CUM LAUDE, and (3) those who maintain a general average within the range of 3.50 to 4.00 will receive SUMMA CUM LAUDE. A minimum of 50 percent of the credit hours required for a degree program must be earned at A & T State University to be considered for honors. This means that if the program requires a total of 126 credit hours, 63 of those hours must be earned at A & T. The computation for honors is based upon all courses taken at this University. Persons who have obtained a baccalaureate degree and return or enroll

for a second baccalaureate degree are not considered for honors. Publication of honors and scholarships is made at commencement.

COMMENCEMENT PARTICIPATION

Students who complete degree requirements during the Summer Session or during the Fall Semester are invited to participate in the commencement exercises along with students who complete degree requirements during the Spring Semester.

Only students who have satisfied all requirements for their degree programs are eligible to march in the commencement exercises.

GRADUATION UNDER A GIVEN CATALOGUE

A student may expect to earn a degree in accordance with the requirements of the curriculum outlined in the catalogue in force when he or she first entered the University provided the courses are being offered. Moreover, he or she must complete these requirements within six years. On the other hand, he or she may graduate under any subsequent catalogue published while he or she is a student. If a student elects to meet the requirements of a catalogue other than the one in force at the time of his or her original entrance he or she must meet all requirements of the catalogue he or she elects.

SECOND BACCALAUREATE DEGREE

A student who has received a bachelor's degree from A&T or another accredited college or university may enroll in a program leading to a second degree at the same level providing (1) the major field is different from that of the first degree and (2) the appropriate application for admission or readmission is filed and approved.

Students seeking a second baccalaureate degree must (1) complete a minimum of twenty-four (24) semes-

ter hours beyond those applied to the first or previous degree, excluding transfer credits or substitutions and dependent upon departmental requirements; (2) be in residence for a minimum of two (2) semesters as a full-time student if the first or previous degree was not earned at A&T; (3) achieve a cumulative minimum point average of 2.0 for all hours attempted for the degree.

GRADE REPORTS

As soon as they are determined at the end of each semester or summer term, a report of grades is sent to the student at his or her permanent home address.

PRIVACY OF STUDENT RECORDS

The University insures students access to their official academic records but prohibits the release of personally identifiable information, other than "directory information", from these records without their permission, except as specified by public law 93-380.

"Directory information" includes: Student's name, address, telephone number, date and place of birth, school, major, sex, marital status, dates of attendance, degree received, honors received, the institution(s) attended prior to admission to North Carolina Agricultural and Technical State University, past and present participation in officially recognized sports and activities, and physical factors.

Public Law 93-380 further provides that any student may, upon written request, restrict the printing of such personal information relating to himself or herself as is usually included in campus directories. A student who desires to have "directory information" withheld must submit a written request to the Office of The Registrar one week before the beginning of classes for the semester or session in which he or she is enrolled

ACCESS TO STUDENT RECORDS

1. The policy for the administration of student academic records is in accordance with the Family Educational Rights and Privacy Act of 1974, as amended.
2. Students have the right to inspect and review any and all official records, files, and data directly related to them.
3. A student who believes that his or her record contains inaccurate or misleading information shall have an opportunity for a hearing to challenge the content of the record, to insure that the record is not inaccurate, misleading, or otherwise in violation of his or her privacy or rights, and to provide an opportunity for the correction or deletion of any such inaccurate, misleading, or otherwise inappropriate data contained therein or include the student's own statement of explanation.

4. The University will comply with requests from students to review their record within a reasonable period of time and not later than thirty (30) days after requests are received.
5. The release of academic records requires the written permission of students, except as provided by public law 93-380. Transcripts are not issued to students who have not met their financial obligations to the University.
6. Copies of the "University's Statement" concerning access to students' records are available in the Office of The Registrar, the office of each school dean and department chairperson.

CHANGE OF NAME AND ADDRESS

It is the obligation of every student to notify the Office of The Registrar of any change in name or address. Failure to do so can cause

serious delay in the handling of student records and in notification of emergencies at home.

TRANSCRIPTS OF RECORDS

Requests for transcripts of students' records should be addressed to the University Registrar. The cost is \$2.00 per copy.

INDEBTEDNESS TO THE UNIVERSITY

No diploma, certificate or transcript of a record will be issued to a student who has not made a satisfactory settlement with the cashier for all indebtedness to the University. A student may not be permitted to attend classes or final examinations after the due date of any unpaid obligation.





SCHOOL OF AGRICULTURE

Burleigh C. Webb, Dean

Philosophy and Objectives. The School of Agriculture embraces the fundamental philosophy of the Land-Grant Institution and it accepts the obligation to provide a program of resident instruction, research and extension. It administers to the general needs of an interdependent rural-urban society and to the special needs of those who desire and benefit from instruction in agriculture and home economics.

The objectives of the School of Agriculture are twofold: (1) to develop the academic proficiency of its students through organized instruction and research and (2) to share its resources with its clientele through organized short courses, conferences, and related activities designed to meet special needs.

AGRICULTURAL RESEARCH PROGRAM

Organized research is conducted in Agriculture and Home Economics by a research faculty with joint appointments in the instructional program. Much of the research activity is sponsored by the United States Department of Agriculture. It is conducted on the University farm and in on-campus laboratories where investigations include such disciplines as Agricultural Economics, Animal Science, Plant Science, Landscape Architecture and Design, Human Nutrition, Textiles, Food Science, and Animal Health.

AGRICULTURAL EXTENSION PROGRAM

Agricultural Extension is an educational service which provides information and assistance in a broad range of subjects to individuals, families, and organized groups in rural and urban areas of the state. The Agricultural Extension

Program at North Carolina Agricultural and Technical State University is an integrated function of the state-wide program headquartered at North Carolina State University, Raleigh, North Carolina.

INTERNATIONAL AGRICULTURAL PROGRAM

The International Agricultural Program involves all departments in the School of Agriculture and relates to the University International Program through the Office of the Coordinator For International Agriculture.

In overseas locations research, teaching, and community out-reach are conducted by faculty in association with long-term development assistance projects. Additionally, faculty share their expertise through short-term assignments for consultation in various overseas settings.

INSTRUCTIONAL PROGRAMS

Departmental Organization:

The School of Agriculture is organized into the following departments: (1) Agricultural Economics and Rural Sociology, (2) Agricultural Education and Extension, (3) Animal Science, (4) Home Economics, and (5) Plant Science and Technology.

Requirements for Admission:

The requirements for admission to the School of Agriculture are the same as the general requirements for admission to the University.

Requirements for Graduation:

The requirements for graduation for the Bachelor of Science Degree are as follows:

1. The student must have satisfied the course requirements of an approved curriculum in an organized department administered by the School of Agriculture.
2. The student must have earned a cumulative average quality of at least a "C" in his or her major courses and in his or her overall academic program.

Curricula:

Departments of the School of Agriculture provide several program options through curricula leading to the Bachelor of Science Degree. These program options accommodate specialization in several areas of the food and agricultural sciences, home economics, and certain allied areas.

The Master of Science Degree is offered in Agricultural Education, Agricultural Economics, and Foods and Nutrition. (For further details please consult the Graduate School Bulletin.)

Department of Agricultural Economics and Rural Sociology

Richard D. Robbins, Chairperson

OBJECTIVES

The Department of Agricultural Economics and Rural Sociology offers programs leading to the Bachelor of Science and Master of Science in Agricultural Economics. Students who pursue the Bachelor of Science degree may concentrate in Agricultural Economics and Agri-business. Also, students majoring in Agricultural Economics may concentrate in Rural Sociology by taking prescribed courses in Sociology and Rural Sociology.

The objective of the programs is to train students in the understanding and application of concepts and analytical tools of economics and business in a systematic approach to identifying, analyzing, and resolving management problems of the farm, agribusiness firms, rural communities, and concerned government agencies, as well as preparing students for further study in Agricultural Economics.

DEGREES OFFERED

Agricultural Economics—B.S.
Agri-Business—B.S.
*Agricultural Economics—M.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree program is based upon the general admission requirements of the University.

DEPARTMENT REQUIREMENTS

The undergraduate major in Agricultural Economics must complete a minimum of 125 semester hours of University courses. Both, Agricultural Economics major and the Agri-business major must take a "core" requirement of 30 semester hours in Agricultural and General Economics.

A representative distribution of disciplines, and requirements for the undergraduate Agricultural Economics majors is as follows:

Discipline Areas	Agricultural Economics Major	Agri-Business Major
General Education	42 Semester Hours	44 Semester Hours
Agricultural Econ.	30 Semester Hours	30 Semester Hours
Economics	12 Semester Hours	12 Semester Hours
Technical Agriculture	9 Semester Hours	9 Semester Hours
Electives	26 Semester Hours	9 Semester Hours
Business Administration and Accounting		12 Semester Hours*

* See the Bulletin of the Graduate School

CAREER OPPORTUNITIES

A bachelor's degree in Agricultural Economics prepares students for careers in teaching, extension, agricultural-related business firms and industries, government and private research firms, government services (legislative, administration, or professional), as well as for further study for higher degrees.

CORE COURSES FOR AGRICULTURAL ECONOMICS MAJORS

Course & Number	*Credit hours	Course Title
Econ. 300	3	Principles of Economics (Micro)
Econ. 301	3	Principles of Economics (Macro)
Ag. Econ. 330	3	Introduction to Agricultural Economics
Ag. Econ. 332	3	Elements of Farm Management
Ag. Econ. 334	3	Marketing Agricultural Products
Ag. Econ. 336	3	Agricultural Prices
Econ. 305	3	Elementary Statistics
or Ag. Econ. 644		
Econ. 310	3	Advanced Statistics
or Ag. Econ. 646		
Econ. 410	3	Intermediate Micro Theory
Econ. 420	3	Intermediate Macro Theory

* A grade of "C" must be made in all of the "core" requirements.

PROGRAM FOR AGRICULTURAL ECONOMIC MAJORS CONCENTRATING IN AGRI-BUSINESS

Freshman

First Semester

English	3
History 100	3
Mathematics 111	4
Physical Science 100	4
Health Education 200	2

16

Second Semester

English 101	3
History 101	3
Mathematics 131	4
Biological Science 100	4
Air or Military Science or Electives	3

17

Sophomore Year

First Semester

Humanities 200	3
Economics 300	3
Psychology 320	3
Animal Science 111	3
Plant Science 110	3

15

Second Semester

Humanities 201	3
Economics 301	3
Ag. Econ. 330	3
Poultry Science 351	3
Ag. Econ. 644	3

15

Junior Year

First Semester

Ag. Econ. 332	3
Accounting 221	3
Ag. Econ. 300	3
Ag. Econ. 646	3
Economics 410	3

15

Second Semester

Ag. Econ. 334	3
Accounting 222	3
Speech 250	2
Electives (Major Area)	6
Economics 420	3

17

Senior Year

First Semester

Ag. Econ. 336	3
Bus. Administration 461	3
Ag. Econ. 675	3
Electives (Major Area)	3
Ag. Econ. 640	3

15

Second Semester

Bus. Administration 462	3
Bus. Administration 453	3
Electives (Major Area)	6
Electives	3

15

Major area electives and other electives should be chosen by the student in consultation with advisor.

PROGRAM FOR AGRICULTURAL ECONOMIC MAJORS

Freshman Year

First Semester

English 100	3
History 100	3
Biological Science 100	4
Mathematics 111	4
Health Education 200	2

16

Second Semester

English 101	3
History 101	3
Physical Science 100	4
Mathematics 113	4
Air or Military Science or Electives	3

17

Sophomore Year

First Semester

Humanities 200 3
Economics 300 3
Animal Science 111 3
Ag. Econ. 300 3
Foreign Language 3

15

Second Semester

Humanities 201 3
Economics 301 3
Plant Science 110 3
Ag. Econ. 330 3
Foreign Language 3
Electives 3

18

Junior Year

First Semester

Poultry Science 351 3
Economics 410 3
Economics 305 or
Ag. Econ. 644 3
Ag. Econ. 334 3
Elective (Major Area) 3
Ag. Econ. 332 3

18

Second Semester

Economics 420 3
Economics 310 or
Ag. Econ. 646 3
Ag. Econ. 336 3
Elective (Major Area) 3
Speech 250 3

15

Senior Year

First Semester

Electives (Major Area) 3
Ag. Econ. 638 3
Free Electives 3
Business Administration
or Math Elective 3

18

Second Semester

Elective (Major Area) 3
Free Elective 3
Business Administration
or Math Elective 3

3

3

3

3

3

18

*Major and other electives should be
chosen by the student in consultation
with advisor.*

COURSES IN AGRICULTURAL ECONOMICS

3
3
3
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14
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6
15
6
3
6
15

130 Survey
240 Computers In Agribusiness
330 Agribusiness Economics
332 Elements of Farm Management
334 Marketing Agricultural
Products
336 Agricultural Prices
440 Resource Economics
442 Cooperative Marketing
444 Agribusiness Marketing
Analysis
446 Financial Management of
Agribusiness Firms
530 Economics of Food
Distribution
599 Independent Study
632 Agricultural Business Policy
634 Commodity Marketing
Problems



- 640 Agri-Business Management
- 642 Seminar in Agricultural Economics
- 644 Statistical Methods in Agricultural Economics I
- 646 Statistical Methods in Agricultural Economics II
- 648 Appraisal and Finance of Agri-Business Firms
- 656 Agricultural Price Analysis
- 675 Computer Applications

COURSES IN RURAL SOCIOLOGY

- 300 Principles of Rural Sociology
- 301 Rural Social Problems
- 303 Rural Family
- 305 Rural Standards of Living
- 506 Special Problems in Rural Sociology
- 599 Independent Study II
- 650 Human Resource Development

DIRECTORY OF FACULTY

Agricultural Economics and Rural Sociology

- Richard D. Robbins, B.S., A. and T. State University; M.S., Ph.D., North Carolina State University at Raleigh; Professor and Chairperson.
- Sidney H. Evans, B.S., Virginia State College; M.S., Iowa State University; Ph.D., Ohio State University; Professor
- Robin G. Henning, B.S., M.S., Ohio State University; Ph.D., Cornell University; Adjunct Assistant Professor.
- Daniel Godfrey, B.S., A. and T. State University; M.S., North Carolina State University at Raleigh; Ph.D., Cornell University; Agricultural Extension Faculty.
- Donald R. McDowell, B.S., Southern University A. and M.; M.S., Ph.D., University of Illinois; Adjunct Assistant Professor.

John O'Sullivan, B.A., Stanford University; M.S., Auburn University; Ph.D., University of California at Los Angeles; Agricultural Extension Faculty.

Alton Thompson, B.S., North Carolina Central University; M.S., Ph.D., Ohio State University; Adjunct Assistant Professor.

Albert O. Yeboah, B.S., University of Ghana; M.S., University of Guelph; M.A., Ph.D., University of Wisconsin; Adjunct Assistant Professor.

Anthony K. Yeboah, B.S., University of Science and Technology; M.S., Ph.D., Iowa State University; Assistant Professor.

Ridgeley Abdul Mu'Min, B.S., M.S., A. and T. State University; Ph.D., Michigan State; Adjunct Assistant Professor.

Department of Agricultural Education and Extension

Arthur P. Bell, Chairperson

The Department of Agricultural Education and Extension prepares students for positions in educational fields in agriculture and related areas including schools and colleges, agricultural extension, business, trade and professional associations, and government agencies. The Department administers a program approved by the State Department of Public Instruction for the preparation of teachers of agriculture in the public school systems. The program includes courses in general education, professional education, and technical agriculture.

DEGREES OFFERED

- Agricultural Education—B.S.
- *Agricultural Education—M.S.

GENERAL PROGRAM REQUIREMENTS

Admission of students to the undergraduate degree program in Agricultural Education is based on the general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

The Agricultural Education majors must complete 130 semester hours of credit. Included in the 130 semester hours are general education courses, professional education courses, and technical agriculture courses. A minimum grade of "C" must be achieved and maintained in these courses.

CAREER OPPORTUNITIES

A degree in Agricultural Education prepares students for careers in educational fields in agriculture and related areas. These included teaching and supervision in schools and colleges, agricultural extension, business and industry, trade and professional organizations and governmental agencies.

**See Graduate Bulletin for details.*

PROGRAM FOR AGRICULTURAL EDUCATION MAJORS

Freshman Year

Course and Number	Fall Semester	Spring Semester
	Credit	Credit
English 100, 101	3	3
Mathematics 101, 102	3	3
History 100, 101	3	3
Botany 140	4	—
Zoology 160	—	4
Physical Education 101, 102	1	1
Agricultural Education 101, 102	1	1
Air or Military Science (Elective)	(1)	(1)
	<u>15</u>	<u>15</u>

Sophomore Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Speech 250	—	2
Psychology 320, 325	3	3
Chemistry 104, 105	4	4
Plant Science 110	—	3
Agricultural Engineering 114	3	—
Animal Science 111	3	—
Humanities 200, 201	3	3
Health Education 200	2	—
Economics 300 or Agricultural Economics 330	—	3
Air or Military Science (Elective)	(2)	(2)
	18	18

Junior Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Agricultural Education 400, 402	2	2
Agricultural Education 401, 403	2	2
Bacteriology 121	4	—
Soil Science 338	—	4
Education 400	3	—
*Technical Agricultural Electives	3	6
Free Electives	3	3
	17	17

Senior Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Agricultural Economics 332	3	—
Agricultural Education 501, 502	3	6
Agricultural Education 503	—	3
Agricultural Engineering 525	—	3
Rural Sociology 300 or Agricultural Education 609	3	—
Zoology 468 or Botany 530	3	—
*Technical Agricultural Elective	3	—
Free Elective	3	—
	18	12

*Fifteen credits should be completed in one subject matter area (Technical Agriculture).

AGRICULTURAL EDUCATION WITH TECHNICAL CONCENTRATIONS

The Agricultural Education major may follow a technical concentration by satisfactorily completing a minimum of 12 credit hours of technical agriculture electives in one of the following subject matter areas:

Agricultural Economics
Agricultural Engineering
Animal Science
Horticulture
Plant Science
Soil Science

The program will be worked out on an individual basis by the student and his/her advisor. Students may do a concentration in the area of Environmental Science by taking selected courses relating to the environment in the above subject matter areas and other areas which will prepare them for such teaching in the Agricultural Curriculum of the secondary schools. The student may also do a concentration in communications by taking selected courses in this area. Suggested courses for these options are available in the Agricultural Education and Extension Department.

DIRECTORY OF FACULTY AND COURSES

Arthur P. Bell, B.S., A&T College; M.S., and Ed.D., The Pennsylvania State University; Professor and Chairperson
Willie T. Ellis, B.S., M.S., A&T College; Ph.D., Cornell University; Professor
Daniel M. Lyons, B.S., M.S., North Carolina Agricultural & Technical State University; Ed.D., Virginia Polytechnic Institute and State University; Agricultural Extension Faculty
Dalton H. McAfee, B.S., Alcorn State University; M.S., Tuskegee Institute; Ph.D., Ohio State University; Agricultural Extension Faculty

Larry D. Powers, B.S., Tuskegee University; M.Ed., Tuskegee University; Ph.D. Michigan State University, Assistant Professor
Francis O. Walson, B.S., A&T State University; M.S., A&T State University; Ed.D., Virginia Polytechnic Institute and State University; Adjunct Assistant Professor

COURSES

- 101 & 102 Introduction and Orientation
- 400 Audio-Visual Aids in Vocational and Technical Education
- 401 Youth Organization and Leadership
- 402 Secondary Education in Agriculture
- 403 Teaching Out-of-School Groups
- 404 Field Experiences in Vocational Agriculture
- 405 Field Experiences in Cooperative Extension
- 406 Field Experiences in Other Agricultural Education programs
- 501 Materials and Methods of Teaching Agricultural Education
- 502 Student Teaching
- 503 Evaluation and Problems in Teaching Agricultural Education
- 600 Youth Organizations and Program Management
- 601 Adult Education in Vocational and Extension Education
- 603 Problem Teaching in Vocational Education
- 604 Public Relations in Agriculture
- 605 Guidance and Group Instruction in Vocational Education
- 606 Cooperative Work-Study Programs
- 607 Environmental Education
- 608 Agricultural Extension Organization and Methods
- 609 Community Analysis and Rural Life
- 664 Occupational Exploration of Middle Grades
- 665 Occupational Exploration in the Middle Grades—Agricultural Occupations

Department of Animal Science

George A. Johnson, Chairperson

OBJECTIVES

The objectives of the Animal Science Department are to prepare students for admission to graduate school, professional school, research and industry; and to provide a service to the people of North Carolina, the Southeast, the United States and the world through resident instruction, research and continuing education.

DEGREES OFFERED

Agricultural Science—B.S.
Agricultural Technology—B.S.
Laboratory Animal Science—B.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree programs in the Department of Animal Science is based upon general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

The programs leading to the B.S. degree in Agricultural Science and in Agricultural Technology require a minimum of 124 semester hours. The program leading to the B.S. degree in Laboratory Animal Science requires a minimum of 128 semester hours.

All programs require a performance level of grade "C" or better.

CAREER OPPORTUNITIES

Agricultural Science and
Agricultural Technology

Career opportunities are available in the following areas: livestock feed industry, livestock production, meat processing, livestock marketing, dairy industry, poultry industry, teaching, research and governmental agencies.

Laboratory Animal Science

Career opportunities for the Laboratory Animal Scientist are found in: pharmaceutical companies; local, state and federal regulatory agencies; biomedical research organizations; animal breeding firms; and laboratory animal resource establishments.

The curriculum in Laboratory Animal Science prepares graduates for admission to schools of veterinary medicine and graduate programs in animal health and related specialties.

PROGRAM FOR BACHELOR OF SCIENCE IN AGRICULTURAL TECHNOLOGY

Freshman Year

Course and Number	Fall Semester Credit	Spring Semester Credit
English 100, 101	3	3
Animal Science 111, Agric. Engineering 114	3	3
Botany 140, Zoology 160	4	4
Mathematics 101, 102	3	3
Agric. Education 101, 102	1	1
	14	14

Sophomore Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Humanities 200, 201	3	3
History 100, 101	3	3
Chemistry 101, 102, 111, 112	4	4
Animal Science 212, 214	3	3
Plant Science 110	3	
Health Education 200		2
	16	15

Junior Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Economics 301, Agric. Economics 330	3	3
Dairy Science 321, Animal Science 311	3	3
Bacteriology 121		4
Soil Science 338; Poultry Sci. 351	3	3
*Electives (Major emphasis)	8	3
	17	16

Senior Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Plant Science 370; Agric. Engineering 402	3	3
Agric. Economics 332	3	3
*Electives (Major emphasis)	6	6
Free Electives	5	3
	17	15

Supporting Courses (Electives)

Agricultural Economics 334, 336;
Business 430; Speech 250, 251;
Chemistry 251, 252; Agricultural
Engineering 303, 523; Industrial
Technology 490; Mathematics 240.

** The major emphasis electives are to be selected in consultation with and consent of the advisor to enable you to specialize in meat animal, dairy or poultry production.*

Required courses for meat animal emphasis: Animal Science 312 and 413, Laboratory Animal Science 461.

Required courses for dairy emphasis: Dairy Science 340, Animal Science 413 and Laboratory Animal Science 461.

Required courses for poultry emphasis: Poultry Science 553, 556, and 657.

** The 28 credits as major electives are to be taken such that: 12 credits are selected from supporting courses; 16 credits are selected from one of the following areas of concentration: Animal Science, Dairy Science, Dairy Technology and Poultry.*

PROGRAM FOR BACHELOR OF SCIENCE IN AGRICULTURAL SCIENCE

Freshman Year

Course and Number	Fall Semester Credit	Spring Semester Credit
English 100, 101	3	3
Animal Science 111; Agric. Engineering 114	3	3
Botany 140, Zoology 160	4	4
Mathematics 111, 113	4	4
Agric. Education 101, 102	1	1
	15	15

Sophomore Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Humanities 200, 201	3	3
History 100, 101	3	3
Chemistry 106, 116; 107, 117	5	5
Animal Science 212, 214	3	3
Plant Science 110;	3	—
Health Education 200	—	2
	17	16

Junior Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Physics 225, 226	4	4
Economics 301;		
Mathematics 224	3	3
Chemistry 221, 223;		
Chem. 222, 224	5	5
Poultry Science 351;		
Bacteriology 121	3	4
Animal Science 340	3	—
	18	16

Senior Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Agric. Economics 330;		
Soil Science 338	3	3
Dairy Science 321	—	3
*Elective (Major emphasis)	6	6
Free Electives	3	3
	12	15

Supporting Courses (Electives)

Zoology 461, 465, 466; Agricultural Economics 332, 334, 336; Chemistry 222, 224, 251, 252; Speech 250-251.

* The major emphasis electives are to be selected in consultation with and consent of the advisor to enable you to specialize in meat animal, dairy or poultry production.

Required courses for meat animal emphasis: Animal Science 312 and 413, Laboratory Animal Science 461.

Required courses for dairy emphasis: Dairy Science 340, Animal Science 413, and Laboratory Animal Science 461.

Required courses for poultry emphasis: Poultry Science 553, 556 and 657.

PROGRAM FOR BACHELOR OF SCIENCE IN LABORATORY ANIMAL SCIENCE

Freshman Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Chemistry 106, 107	3	3
Chemistry Lab. 116, 117	2	2
English 100, 101	3	3
Math 111, 112	4	4
Physical Educa.		
Electives	1	—
Lab Animal Science 161, 162	1	3
	14	15

Sophomore Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Biology 140, 160	4	4
Chemistry 221, 222	3	3
Chemistry Lab. 223, 224	2	2
Humanities 200, 201	3	3
Lab Animal Science 261	3	—
Political Science 200	3	—
Math 224	—	3
Speech 250	3	2
	18	18

Junior Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Animal Science 214	3	—
Biology 121	—	4
Laboratory Animal Science 361, 362	4	3
Laboratory Animal Science 365	4	—
History	—	3
Physics 225, 226	3	3
Physics 235, 236	1	1
Chemistry 251	2	—
Chemistry 252	1	—
Electives	—	3
	18	17

Senior Year

Course and Number	Fall Semester Credit	Spring Semester Credit
Personnel Mgt 522	—	3
Animal Science 611	—	4
Laboratory Animal Science 461, 569	3	1
Laboratory Animal Science 462	3	—
Laboratory Animal Science 562	—	3
Laboratory Animal Science 563	—	4
Electives	3	—
Major Elective	3	—
Physical Ed Elect	1	—
	13	15

Total Semester Hours 128

VETERINARY MEDICAL PREPARATION

(Pre-Veterinary)

Preparation for admission to the School of Veterinary Medicine, North Carolina State University, is offered through the program leading to the bachelor of science degree in Laboratory Animal Science at North Carolina Agricultural and Technical State University.

After satisfactory completion of specific undergraduate course requirements the major in laboratory animal science is eligible to apply for admission to veterinary school (see major advisor).

DIRECTORY OF FACULTY AND COURSES

George A. Johnson, M.S., Cornell University; DVM., Tuskegee Institute; Professor and Chairperson

Adedamola Ademoyero, B.S., A&T State University; M.S., Tuskegee Institute; Instructor

John Allen, B.S., University of Georgia; M.S., Ph.D., University of North Carolina

Doris Fultz, B.S., Virginia Commonwealth University; B.S., DVM, Tuskegee Institute; Assistant Professor

Fields C. Gunsett, B.S., University of California; M.S., University of Idaho; Ph.D., University of Wisconsin; Adjunct Associate Professor

Amos Kennedy, B.S., Southern University; M.S., Ph.D., Michigan State University; Adjunct Professor

David Libby, B.S., Ph.D., University of Maine; Associate Professor

Ray McKinnie, B.S., A&T State University; M.S., Ohio State University; Ph.D., N.C. State University; Agricultural Extension Faculty

Tracy L. Hanner, B.S., North Carolina Central University; DVM, North Carolina State University

Edward C. Segerson, B.S., M.S., Memphis State University; Ph.D., North Carolina State University; Associate Professor

Alfreda Webb, B.S., Tuskegee Institute; M.S., Michigan State University; DVM, Tuskegee Institute; Professor
 Willie Willis, B.S., Fort Valley State College; M.S., Ph.D., Colorado State University; Assistant Professor

Courses in Animal Science

- 110 Science of Animals that Serve Mankind
- 111 Introduction to Animal Science
- 212 Applied Nutrition and Feeding
- 214 Agricultural Genetics
- 217 Anatomy and Physiology of Farm Animals
- 311 Livestock Production
- 312 Meat and Meat products
- 313 Livestock Evaluation
- 315 Horse Production
- 413 Sanitation and Diseases of Farm Animals
- 611 Principles of Animal Nutrition
- 613 Livestock and Meat Evaluation
- 614 Animal Breeding
- 615 Selection of Meat and Meat Products
- 617 Physiology of Reproduction of Farm Animals
- 618 Seminar in Animal Science
- 619 Special Problems in Livestock Management
- 713 Advanced Livestock Production

Courses in Poultry Science

- 351 Production
- 354 Fundamentals of Poultry Breeding
- 553 Diseases and Parasites of Poultry
- 555 Incubation and Hatchery Management
- 556 Processing and Marketing of Poultry Products
- 657 Poultry Anatomy and Physiology
- 659 Special Problems in Poultry
- 750 Poultry Research

Courses in Food Science

- 536 Food Plant Management
- 541 Food Packaging

Courses in Laboratory Animal Science

- 161 Orientation I
- 162 Introduction to Laboratory Animal Science
- 261 Medical Terminology
- 361 Integrated Anatomy
- 362 Microscopic Anatomy
- 363 Internship I
- 365 Biology, Diseases and Care of Laboratory Animals
- 461 Physiology of Domestic Animals
- 462 Principles of Medical Science
- 463 Internship II
- 464 Types and Breeds of Food Animals
- 465 Types and Breeds of Companion Animals
- 466 Types and Breeds of Laboratory Animals
- 562 Environmental Toxicology
- 563 Laboratory Animal Management and Clinical Techniques
- 564 Introduction to Research
- 569 Seminary in Laboratory Animal Science
- 660 Special Problems in Specimen Preparation
- 661 Special Problems in Electron and Light Microscopy
- 662 Special Problems in Radiology
- 663 Special Problems in Tissue Culture and Histochemistry
- 664 Special Problems in Radio-Immunology, Radio-Isotopes and Tracer Techniques

DEPARTMENT OF HOME ECONOMICS

Harold E. Mazyck, Chairperson

OBJECTIVES

The objectives of the Home Economics Department are:

1. To develop satisfying personal, group and family relationships as a basis for active participation in a democratic society;
2. To understand the enrichment of home and family living through the appreciation and use of art and advances in

science and technology;

3. To develop an understanding and appreciation of varying cultural backgrounds; and
4. To prepare the individual for gainful employment in one of the major areas of the profession.

DEGREES OFFERED

1. Home Economics—Concentration in Clothing, and Fashion Merchandising—B.S.
Food and Nutrition—B.S.
Dietetics—B.S.
Home Economics Education—B.S.
Child Development—B.S.
2. Food Science—B.S.
3. *Food and Nutrition—M.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree programs in the Home Economics Department is based upon the general admission requirements of the University.

** See Graduate Bulletin for graduate program requirements.*

DEPARTMENTAL REQUIREMENTS

Home Economics undergraduate major—the major in Home Economics and Food Science and all of the concentrations must complete the required programs of course work. A minimum grade of "C" is expected in all courses and required in all major courses for graduation.

ACCREDITATION

The Home Economics Department is nationally accredited by the American Home Economics Association.

The Home Economics Teacher Education program is accredited by the National Council for Accreditation of Teacher Education and

approved by the North Carolina State Department of Public Instruction under the University-wide accreditation and approval of teacher education programs.

The Dietetic program is approved under Plan IV by the American Dietetic Association.

CAREER OPPORTUNITIES

The programs in the home economics department prepare students for careers in child development, clothing and fashion merchandising, dietetics, food and nutrition, food science, teaching of home economics in junior and senior high schools, extension services, consumer services and public relations.

CLOTHING AND FASHION MERCHANDISING

Freshman Year

Course and Number	Fall Semester	Spring Semester
English 100, 101	3	3
Math 111, 115	4	3
History 100, 101	3	3
Physical Ed. 101, 102	1	1
Art 224 or 225	2	
Home Economics 126		3
Home Economics 101**	1	
Home Economics 122, 123	2	3
	<u>16</u>	<u>16</u>

Sophomore Year

Humanities 220, 201	3	3
Natural Science	4	4
Art 226	3	
Home Economics 135		3
Business Ad. 220	3	
Home Economics 422 or 423		4
Home Economics 321	4	
Foreign Language		3
	<u>17</u>	<u>17</u>

Junior Year

Accounting 221	3	
Business Education 360		3
Home Economics 424	3	
Business Ad. 430		3
Anthropology 200 or 300	3	
Home Economics 425		3
Psychology 320		3
Economics 300 or 301	3	
Home Economics 614**		3
Home Economics 401		3
Speech 250	3	
Electives	3	
	<u>18</u>	<u>18</u>

Senior Year

Business Ad. 433	3	
Home Economics, 426, 523	3	4
Home Economics, 521, 403	4	3
Home Economics 525, 428	3	3
Home Economics 612**, 310	3	3
Electives		3
	<u>16</u>	<u>16</u>

*Home Economics Core Courses

CHILD DEVELOPMENT CURRICULUM

Freshman Year

Course and Number	Fall Semester	Spring Semester
English 100, 101	3	3
Mathematics 101, 102	3	3
History 100, 101	3	3
Home Economics 101*, 310	1	3
Home Economics 122, 135	2	3
Health Education 200	2	
Physical Ed. 101, 102	1	1
	<u>15</u>	<u>16</u>

Sophomore Year

Humanities 200, 201	3	3
Home Economics 311, 312	3	3
Physical Science 100	3	
Physical Science 110	1	
Biology 100		4
Sociology 100		3
Home Economics 414, 415	3	3
Psychology 320	3	
Electives		2
	<u>16</u>	<u>18</u>

Junior Year

Home Economics 416, 418	3	3
Home Economics 632, 420	3	3
Home Economics 400, 614**	3	3
Home Economics 421, 434	3	3
Psychology 435	3	
Music 609		3
Speech 250	3	
Home Economics 403		3
	<u>18</u>	<u>18</u>

Senior Year

Art 600 or 226 or 100	3	
Home Economics 612**	3	
Home Economics 519	3	
Home Economics 417	2	
Home Economics 401		3
Home Economics 419		3
Electives	3	9
	<u>17</u>	<u>15</u>

HOME ECONOMICS EDUCATION

Freshman

Course and Number	Fall Semester	Spring Semester
English 100, 101	3	3
Mathematics 101, 102	3	3
History 100, 101	3	3
Home Economics 101**	1	
Home Economics 122, 123	2	3
Biology 100		4
Home Economics 130	3	
Physical Ed. 101		1
	<u>15</u>	<u>17</u>

Sophomore Year

Sociology 100 or 200	3	3
Chemistry 104		1
Chemistry 114		
Home Economics 331		2
Humanities 200, 201	3	3
Home Economics 321	4	
Speech 250		3
Health Education 200	2	
Education 301		2
Education 300	2	
Psychology 320		3
Electives	3	
	<u>17</u>	<u>17</u>

Junior Year

Home Economics 300, 403	3	3
Home Economics 503, 500	3	3
Home Economics 502, 310	2	3
Home Economics 400, 679	3	3
Economics 300	3	
Home Economics 614**		3
Education 436	3	
	17	15

Senior Year

Home Economics 612**, 604	3	3
Home Economics 401	3	
Home Economics 505	3	
Education 560		6
Education 637		3
Education 400	3	
Education 528	3	
Electives	3	
	18	12

FOOD SCIENCE

Freshman Year

Course and Number	Fall Semester	Spring Semester
Mathematics 111, 112	4	4
English 100, 101	3	3
History 100, 101	3	3
Botany 140 or Zoology 160 or Biology 100	4	
Speech 250		3
Home Economics 135		3
PE 101, 102	1	1
Home Economics 101**	1	
	16	17

Sophomore Year

Chemistry 101, 102	3	3
Chemistry 111, 112	1	1
Home Economics 236, 337	3	3
Humanities 200, 201	3	3
Business Ad. 341	3	
Electives	3	
Agri. Economics 330 or Economics 300 or 301		3
Home Economics 403		3
	16	16

Junior Year

Biology 121	4	
Home Economics 631		3
Animal Science 312 or Animal Science 340 or Animal Science 556	3	
Physics 201		3
Math 224		3
Business Ad. 220, 422	3	3
Business Ad. 430		3
Home Economics 614**		3
Chemistry 221	3	
Chemistry 223	2	
	15	18

Senior Year

Home Economics 643, 633	3	3
Home Economics 618, 638	1	3
Animal Science 338		3
Biology 420	3	
Plant Science 622		3
Chemistry 251	2	
Chemistry 252	1	
Animal Science 522		3
Home Economics 612**, 310	3	3
Animal Science 541	2	
Electives	3	
	18	18

FOOD AND NUTRITION

The option in food and nutrition provides preparation for a position as an assistant technician in a research laboratory but it is designed primarily for entrance in graduate study. A student desiring to meet the requirements of The American Dietetic Association for an approved internship may qualify by taking courses listed under *ADA Plan IV Approved Courses*.

FOOD AND NUTRITION

Freshman

Course and Number	Fall Semester	Spring Semester
English 100, 101	3	3
Mathematics 111, 112	4	4
History 100, 101	3	3
Chemistry 106, 107	3	3
Chemistry 116, 117	2	2
PE 101, 102	1	1
Home Economics 101**	1	
	17	16

Sophomore Year

Zoology 160, 461	4	4
Humanities 200, 201	3	3
Chemistry 221, 222	3	3
Chemistry 223, 224	2	2
Psychology 320	3	
Bacteriology 121		4
Home Economics 122	2	
	17	16

Junior Year

Home Economics 236, 338	3	3
Chemistry 231, 251	3	2
Chemistry 232, 252	2	1
Home Economics 130, 337	3	3
Physics 201	3	
Home Economics 331		2
Home Economics 614**		3
Electives	2	3
	16	17

Senior Year

Home Economics, 401, 403	3	3
Home Economics 635, 637	3	3
Home Economics 612,** 310	3	3
Electives	7	6
	16	15

*Add Plan IV approved courses.

**Home Economics Core Courses

DIETETICS

Minimum Academic Requirements of The American Dietetic Association for Specialization in an Area of Dietetics

The program outlined below meets the minimum basic requirements of The American Dietetic Association. Areas of specialization should be selected in consultation with the academic advisor. Completion of the basic plus the area of specialization requirements which follow will prepare a graduate for an approved American Dietetic Association internship.

Dietetics (General)

Freshman Year

First Semester	Credit
*English 100	3
History 100	3
*Math 111	4
PE 101	1
**Home Ec. 101	1
*Chemistry 104	3
*Chemistry 114	1
Home Ec. 122	2
	18

Second Semester

Second Semester	Credit
*English 101	3
History 101	3
*Math 112	4
PE 102	1
*Chemistry 105	3
*Chemistry 115	1
Electives	3
	18

Sophomore Year

First Semester	Credit
Zoology 160	4
Humanities 200	3
*Psychology 320	3
*Home Ec. 130	3
*Home Ec. 344	3
	16

<i>Second Semester</i>	Credit
*Zoology 461	4
Humanities 201	3
*Business Ad. 220	3
Home Ec. 331	2
*Home Ec. 345	3
*Home Ec. 346	3
	<hr/>
	18

Junior Year

<i>First Semester</i>	Credit
*Home Ec. 236	3
*Bacteriology 121	4
*Home Ec. 448	4
*Psychology 435	3
Sociology 200	3
	<hr/>
	17

<i>Second Semester</i>	Credit
*Home Ec. 337	3
*Economics 300	3
Economics 301	
Home Ec. 401	3
**Home Ec. 614	3
Home Ec. 403	3
*Math 224	3
Sociology 302	
	<hr/>
	18

Senior Year

<i>First Semester</i>	Credit
**Home Ec. 612	3
*Chemistry 251	2
*Chemistry 252	1
*Home Ec. 439 or	3
*Home Ec. 630	
English 331	3
Business Ad. 360	3
	<hr/>
	15
<i>Second Semester</i>	Credit
Home Ec. 310	3
*Home Ec. 338	3
*Business Ad. 422	3
*Home Ec. 679	3
*Business Ad. 341	3
	<hr/>
	15

*ADA Plan IV Approved Courses
**Home Economics Core Courses

DIETETICS (MANAGEMENT)

Freshman Year

<i>First Semester</i>	Credit
*English 100	3
History 100	3
*Math 111	4
PE 101	1
**Home Ec. 101	1
*Chemistry 104	3
*Chemistry 114	1
Home Ec. 122	2
	<hr/>
	18

<i>Second Semester</i>	Credit
*English 101	3
History 101	3
*Math 112	4
PE 102	1
*Chemistry 105	3
*Chemistry 115	1
Electives	3
	<hr/>
	18

Sophomore Year

<i>First Semester</i>	Credit
Zoology 160	4
Humanities 2009	3
*Psychology 320	3
*Home Ec. 130	3
*Home Ec. 344	3
	<hr/>
	16

<i>Second Semester</i>	Credit
*Zoology 461	4
Humanities 201	3
*Business Ad. 220	3
Home Ec. 331	2
*Home Ec. 345	3
*Home Ec. 346	3
	<hr/>
	18

Junior Year

<i>First Semester</i>	Credit
*Home Ec. 236	3
*Bacteriology 121	4
*Home Ec. 448	4
*Psychology 435	3
*Business Ad. 341	3
	<hr/>
	17

<i>Second Semester</i>	Credit
*Home Ec. 337	3
*Economics 300	3
Economics 301	
Home Ec. 401	3
Home Ec. 403	3
*Math 224	3
Sociology 302	
**Home Ec. 614	3
	<hr/>
	18

Senior Year

<i>First Semester</i>	Credit
**Home Ec. 612	3
*Home Ec. 338	3
*English 331 or	3
Business Ad. 360	
Accounting 221	3
*Business Ad. 422	3
	<hr/>
	15

<i>Second Semester</i>	Credit
Home Ec. 310	3
*Home Ec. 630	3
*Home Ec. 679	3
*Business Ad. 522	3
*Economics 501	3
	<hr/>
	15

*ADA Plan IV Approved Courses
**Home Economics Core Courses

DIETETICS (COMMUNITY)

Freshman Year

<i>First Semester</i>	Credit
*English 100	3
History 100	3
*Math 111	4
PE 101	1
**Home Ec. 101	1
*Chemistry 104	3
*Chemistry 114	1
Home Ec. 122	2
	<hr/>
	18

<i>Second Semester</i>	Credit
*English 101	3
History 101	3
*Math 112	4
PE 102	1
*Chemistry 105	3
*Chemistry 115	1
	<hr/>
	18

Sophomore Year

<i>First Semester</i>	Credit
Zoology 160	4
Humanities 200	3
*Psychology 320	3
*Home Ec. 130	3
*Home Ec. 344	3
	<hr/>
	16

<i>Second Semester</i>	Credit
*Zoology 461	4
Humanities 201	3
*Business Ad. 220	3
Home Ec. 331	2
*Home Ec. 345	3
*Home Ec. 346	3
	<hr/>
	18

Junior Year

<i>First Semester</i>	Credit
*Home Ec. 236	3
*Bacteriology 121	4
*Home Ec. 448	4
*Psychology 435	3
Sociology 200 or	3
Sociology 100	1
	<hr/>
	17

<i>Second Semester</i>	Credit
*Home Ec. 337	3
*Economics 300	3
Economics 301 or	
Home Ec. 401	3
**Home Ec. 614	3
Home Ec. 403	3
*Math 224 or	3
Sociology 302	1
	<hr/>
	18

Senior Year

<i>First Semester</i>	Credit
**Home Ec. 612	3
*Chemistry 251	2
*Chemistry 252	1
*Home Ec. 439	3
*Home Ec. 338	3
English 331 or	3
Business Ad. 360	
*Business Ad. 422	3
	<hr/> 18

<i>Second Semester</i>	Credit
Home Ec. 310	3
*Home Ec. 630	3
*Home Ec. 679	3
*Home Ec. 648	3
*Business Ad. 341	3
	<hr/> 15

*ADA Plan IV Approved Courses

**Home Economics Core Courses

DIETETICS (CLINICAL)

Freshman Year

<i>First Semester</i>	Credit
*English 100	3
History 100	3
*Math 111	4
PE 101	1
**Home Ec. 101	1
Home Ec. 122	2
*Chemistry 104	3
*Chemistry 114	1
	<hr/> 18

<i>Second Semester</i>	Credit
*English 101	3
History 101	3
*Math 112	4
PE 012	1
*Chemistry 105	3
*Chemistry 115	1
Electives	3
	<hr/> 18

Sophomore Year

<i>First Semester</i>	Credit
Zoology 160	4
Humanities 200	3
*Psychology 320	3
*Home Ec. 130	3
Home Ec. 334	3
	<hr/> 16

<i>Second Semester</i>	Credit
*Zoology 461	4
Humanities 201	3

*Business Ad. 220	3
Home Ec. 331	2
Home Ec. 345	3
Home Ec. 346	3
	<hr/> 18

Junior Year

<i>First Semester</i>	Credit
*Home Ec. 236	3
*Bacteriology 121	4
Home Ec. 448	4
*Psychology 435	3
*Sociology 100 or	3
Sociology 200	
	<hr/> 17

<i>Second Semester</i>	Credit
*Home Ec. 337	3
*Economics 300 or	3
Economics 301	
Home Ec. 401	3
**Home Ec. 614	3
Home Ec. 403	3
*Math 224 or	3
Sociology 302	
	<hr/> 18

Senior Year

<i>First Semester</i>	Credit
**Home Ec. 612	3
*Home Ec. 439	3
*Home Ec. 338	3
English 331 or	3
Business Ad. 360	
*Chemistry 251	2
*Chemistry 252	1
*Business Ad. 422	3
	<hr/> 18

<i>Second Semester</i>	Credit
Home Ec. 310	3
*Home Ec. 630	3
*Home Ec. 679	3
*Business Ad. 341	3
*Home Ec. 632 or	3
Home Ec. 640	
*Biology 469	3
	<hr/> 18

*ADA Plan Approved Courses

**Home Economics Core Courses

DIRECTORY OF FACULTY AND COURSES

Home Economics

Harold Mazyck, B.S., South Carolina State College; M.A., New York University; Ph.D., The University of North Carolina at Greensboro; Professor and Chairperson

Ramona T. Clark, B.A.S.W., M.S.W., California State University; Ph.D., Oklahoma State University; Associate Professor

Eileen C. Francis, B.S., M.A. and Ph.D., Pennsylvania State University; Adjunct Assistant Professor

Seetha Ganapathy, B.S., University of Mysore; Ph.D., University of Bombay; Professor

Duanne D. Hoffler, B.S., Bennett College; M.Ed., The University of North Carolina—Greensboro; Adjunct Instructor

Bobby L. Medford, B.A., M.A., Guilford College; Ph.D., The University of North Carolina; Associate; Professor

Eva E. Moore, B.S., West Virginia State College; M.S., University of Illinois; Ph.D., The University of North Carolina at Greensboro; Professor

Rosa Siler Purcell, B.S., North Carolina A&T State University; M.Ed., Ed.D., University of Illinois; Adjunct Assistant Professor

Chung Woon Seo, B.S., M.S., Korea University; Ph.D., Florida State University; Professor

Gladys Shelton, B.S., North Carolina Central University; M.S., Cornell University; Research Associate

Anna A. Simkins, B.S., M.S., Pennsylvania State University; Ph.D., The University of North Carolina at Greensboro; Associate Professor

Carolyn S. Turner, B.S., M.S., University of North Carolina at Greensboro; Ph.D., Virginia Polytechnic and State University; Research Associate

Eula King Vereen, R.D.; B.S., Tennessee State University; M.S., The University of North Carolina at Greensboro; Assistant Professor

Katye G. Watson, B.S., North Carolina A & T State University; Certificate, Elliott Pearson Nursery School; Ed.M., Tufts University; Assistant Professor

COURSES

Undergraduate

101 Introduction to Home Economics

104 The Individual and His Family in Contemporary Society
 105 Etiquette in Today's Society
 122 Clothing in Contemporary Environment
 123 Textiles
 126 Theory and Fundamental of Fashion Illustration
 130 Food Preparation
 133 Family Food
 135 Food and Man's Survival
 200 Introduction to Home Economics Education
 236 Introduction to Food Science
 300 Program Planning in Home Economics K-12
 301 Health and Home Nursing
 310 Introduction to Human Development
 311 Child Development: Prenatal through Middle Childhood
 312 Adolescence and Young Adulthood
 313 Adulthood
 314 Human Ecology of the Family
 321 Basic Clothing Construction
 323 Home Furnishing Laboratory
 331 Meal Management
 332 Cultural Aspects of Food
 337 Introduction to Human Nutrition
 338 Diet Therapy
 344 Institution Organization and Management I
 345 Institution Organization and Management II
 346 Institution Purchasing
 400 Contemporary Housing
 401 Family Relations
 403 Consumer Problems
 410 Practicum in Child Care
 414 Materials, Methods and Evaluation I
 415 Materials, Methods and Evaluation II
 416 Play Materials and Equipment for the Preschool Child
 417 Parent Education
 418 Curriculum in Preschool Education
 419 Practicum in Community Service
 420 Day Care Services
 421 The Cognitively Oriented Pre-school Curriculum
 422 Creative Dress Design and Pattern Study
 423 Contemporary and Traditional Methods of Tailoring
 424 Historic Developments of Costume and Textiles
 425 Fashion Motivation
 426 Problems in Clothing

427 Problems in Textiles
 428 Problems in Fashion Merchandising
 437 Cooperative Training in Industry I
 439 Clinical Nutrition
 447 Institution Equipment
 448 Quantity Cookery
 500 Occupational Home Economics
 502 Household Equipment
 503 Concepts in Esthetic Ecology
 505 Home Management
 519 Practicum in the Preschool
 521 Field Experience
 522 Food Engineering
 523 Seminar in Fashion Apparel Fundamentals
 525 Fashion Marketing and Merchandising
 541 Food Packaging
 544 Field Experience in Food Administration
 547 Cooperative Training in Industry II
 549 Food Consultation for Older Adults

Advanced Undergraduate and Graduate

602 Adult Education in Home Economics
 603 Special Problems in Home Economics I
 604 Seminar in Home Economics Education
 605 Home Economics Summer Study Abroad
 606 Cooperative Extension
 607 Cooperative Extension—Field Experience
 608 Teaching Adults and Youth in Out-of-School Groups
 612 Senior Seminar
 613 Substance Abuse
 614 An Integrative Approach to Home Economics
 618 Food Technology Seminar
 625 Experimental Clothing and Textiles
 626 Tailoring
 630 Advanced Nutrition
 631 Food Chemistry
 632 Maternal and Developmental Nutrition
 633 Food Analysis
 635 Introduction to Research Methods in Food and Nutrition
 636 Food Promotion
 637 Special Problems in Food, Nutrition or Food Science
 638 Sensory Evaluation
 640 Geriatric Nutrition
 641 Current Trends in Food Science

643 Food Preservation
 645 Special Problems in Food Administration
 646 Readings in Food Administration
 648 Community Nutrition
 650 International Nutrition
 664 Occupational Exploration in Middle Grades
 665 Occupational Exploration in the Middle Grades—Home Economics
 679 Nutrition Education

COOPERATIVE PROGRAM IN FOOD SCIENCE

The Food Science program emphasizes two types of training. (1) provides 4 years of Food Science at North Carolina A&T with the opportunity for the student to pursue supportive electives in such areas as Business Administration, Food and Nutrition, and Dairy Technology. (2) a co-operative program between North Carolina A&T State and North Carolina State University in Raleigh. In this program a student has 3 years at North Carolina A&T and the final year of professional study at North Carolina State University with emphasis on laboratory research, experimentation, and preparation for graduate study.

Food Science

135 Food and Man's Survival
 236 Introduction to Food Science
 337 Introduction to Human Nutrition
 AS 340 Milk and Milk Products
 AS 312 Meat and Meat Products
 AS 522 Food Engineering
 AS 536 Food Plant Management
 AS 541 Food Packaging
 547 Cooperative Training in Industry II
 AS 556 Poultry Products

Advanced Undergraduate and Graduate

AS 618 Food Technology Seminar
 631 Food Chemistry
 633 Food Analysis
 637 Special Problems in Food and Nutrition and Food Science
 643 Food Preservation
 BIO 420 Food Microbiology
 PL SC 622 Environment and Waste Management

Department of Plant Science and Technology

Samuel J. Dunn, Chairperson

OBJECTIVES

The objectives of the Department of Plant Science and Technology are to meet its responsibilities to society by providing training for professional agriculturalists and environmentalists who can identify, analyze, and solve the problems of today, as well as new problems that may arise in the future. Realizing the dynamic and ever changing nature of modern society, the department seeks to minimize prescriptive procedures and seeks to provide its students with the tools of analysis and the facilities for applying the natural, physical and social sciences to thinking processes that will enable them to relate to man's present and future needs in managing his environment.

DEGREES OFFERED

- Agricultural Technology—B.S.
Options: (Horticulture, Plant Science and Soil Science, and Agricultural/Industrial Technology.
- Agricultural Science—B.S.
Options:
A. Horticulture, Plant Science or Soil Science
B. Agricultural Engineering
C. Earth and Environmental Science
- Agricultural Business—B.S.
Options: (Horticulture, Plant Science and Soil Science)
- Landscape Architecture—B.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree programs and qualification for the B.S. degree

in Plant Science and Technology are based upon the general admission and graduation requirements of the University.

DEPARTMENTAL REQUIREMENTS

Majors in the Department of Plant Science and Technology must complete a minimum of 124 semester hours of University courses. Included in the 124 hours are thirty hours in a major elective depending on the option.

Suggested Curriculum Guide for Plant Science and Technology

PROGRAMS IN AGRICULTURAL TECHNOLOGY

The following options are offered in the Department of Plant Science and Technology leading to the B.S. degree in Agricultural Technology.

OPTION A—(HORTICULTURE, PLANT SCIENCE AND SOIL SCIENCE

Freshman Year

<i>First Semester</i>	Credit
English 100	3
History 100	3
Chemistry 106	3
Chemistry 116	2
Mathematics 101	3
Agricultural Education 101	1
Air or Military Science or Elective	<u>1</u>
	16

<i>Second Semester</i>	Credit
English 101	3
History 101	3
Chemistry 107	3
Chemistry 117	2
Mathematics 102	3
Agricultural Education 102	1
Air or Military Science or Elective	<u>1</u>
	16

Sophomore Year

<i>First Semester</i>	Credit
Humanities 200	3
Botany 140	4
Soil Science 338	4
Plant Science 110	3
Health Education 200	<u>2</u>
	16

<i>Second Semester</i>	Credit
Humanities 201	3
Zoology 160	4
Animal Science 301	3
Poultry Science 317	3
Air or Military Science (Elective)	<u>3</u>
	16

Junior Year

<i>First Semester</i>	Credit
Physics 225	3
Physics 235	1
Bacteriology 121	4
Economics 301	3
*Electives (Major Area)	<u>6</u>
	17

<i>Second Semester</i>	Credit
Physics 226	3
Physics 236	1
Plant Pathology 530	4
Agricultural Economics 330	3
*Electives (Major Area)	<u>6</u>
	17

Senior Year

<i>First Semester</i>	Credit
Plant Propagation 334	3
Agricultural Engineering 303	3
Plant Science Seminar 520	1
Electives (Major Area)	<u>10</u>
	17

<i>Second Semester</i>	Credit
Earth Science 309	3
Agricultural Engineering 304	3
Plant Science Seminar 520	1
Electives (Major Area)	<u>10</u>
	17

* The 30 credits required as major electives in Plant Science and Soil Science are to be taken such that 12 credits are elected from supporting courses; 18 credits are elected from one of the optional areas with approval of the advisor.

OPTION B--AGRICULTURAL/ INDUSTRIAL TECHNOLOGY

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Math 111	4
Botany 140	4
Mechanical Engineering 101	3
History 100	3
	<u>17</u>

Second Semester

	Credit
English 101	3
Agricultural Eng. 100	3
Agricultural Engineering 114	3
Mechanical Engineering 102	3
History 101	3
	<u>15</u>

Sophomore Year

<i>First Semester</i>	Credit
Chemistry 101, 111	4
Math 113	3
Humanities 200	3
Industrial Technology 293	3
Industrial Technology 472	4
	<u>17</u>

Second Semester

	Credit
Chemistry 102, 112	4
Math 240	3
Humanities 201	3
Speech 250	2
Accounting 221	3
Plant Science 520	1
	<u>16</u>

Junior Year

<i>First Semester</i>	Credit
Physics 225, 235	4
Psychology 320	3
Business Administration 420	3
Industrial Technology 491	3
Agricultural Engineering 303	3
	<u>16</u>

Second Semester

	Credit
Physics 226, 236	4
Business Administration 422	3
Agricultural Eng. 523	3
Economics 305	3
Agricultural Eng. 401	3
	<u>16</u>

Senior Year

<i>First Semester</i>	Credit
Business Administration 522	3
Business Law 451	3
Economics 301	3
Agricultural Economics 330	3
Electives	3
	<u>15</u>

Second Semester

	Credit
Industrial Technology 493	3
Business Law 452	3
Agricultural Eng. 402	3
Electives	6
	<u>15</u>

PROGRAMS IN AGRICULTURAL SCIENCE

The following options are offered in the Department of Plant Science and Technology leading to the B.S. degree in Agricultural Science:

- Options in Horticulture, Plant Science, or Soil Science
- Option in Agricultural Engineering Science
- Option in Earth and Environmental Science

OPTION A--HORTICULTURE, PLANT SCIENCE SOIL SCIENCE

Freshman Year

<i>First Semester</i>	Credit
English 100	3
History 100	3
Chemistry 106	3
Chemistry 116	2
Mathematics 111	4
Agricultural Education 101	1
Air or Military Science or Elective	1
	<u>17</u>

Second Semester

	Credit
English 101	3
History 101	3
Chemistry 107	3
Chemistry 117	2
Mathematics 112	4
Agricultural Education 102	1
Air or Military Science or Elective	1
	<u>17</u>

Sophomore Year

<i>First Semester</i>	Credit
Humanities 200	3
Soil Science 338	4
Poultry Science-317	3
Plant Science 110	3
Air or Military Science or Elective	3
	<u>16</u>

Second Semester

	Credit
Humanities 201	3
Zoology 160	4
Animal Science 301	3
Health Education	2
Air or Military Science or (Elective)	4
	<u>16</u>

Junior Year

<i>First Semester</i>	Credit
Physics 225	3
Physics 235	1
Chemistry 221	3
Chemistry 223	2
Botany 140	4
Electives (Major Area)	4
	<u>17</u>

Second Semester

	Credit
Physics 226	3
Physics 236	1
Chemistry 222	3
Chemistry 224	2
Economics 301	3
Electives (Major Area)	5
	<u>17</u>

Senior Year

<i>First Semester</i>	Credit
Mathematics 224	3
Bacteriology 121	4
Electives (Major Area)	8
	<u>15</u>

Second Semester

	Credit
Agricultural Economics 330	3
Soil Microbiology 421	4
Electives (Major Area)	8
	<u>15</u>

OPTION B—AGRICULTURAL ENGINEERING SCIENCE

Freshman Year

<i>First Semester</i>	Credit
English 100	3
History 100	3
Chemistry 101	3
Chemistry 111	1
Mathematics 131	4
Mech. Engr. 101	3
	<u>17</u>

Second Semester

<i>Second Semester</i>	Credit
English 101	3
History 101	3
Chemistry 102	3
Chemistry 112	1
Mathematics 132	4
Agri. Engr. 100	3
	<u>17</u>

Sophomore Year

<i>First Semester</i>	Credit
Physics 241	4
Physics 251	1
Botany 140	4
Mathematics 231	4
General Microbiology	4
	<u>17</u>

Second Semester

<i>Second Semester</i>	Credit
Humanities 200	3
Physics 242	4
Physics 252	1
Mech. Engr. 335	3
Mathematics 240	3
Econ. 301	3
	<u>17</u>

Junior Year

<i>First Semester</i>	Credit
Mech. Engr. 337	3
EE 200, 206	4
Mech. Engr. 336	3
Mech. Engr. 346	1
Agri. Engr. 401	3
Agri. Engr. 303	3
	<u>17</u>

Second Semester

<i>Second Semester</i>	Credit
Soil Sci. 338	4
I.E. 210	2
Mech. Engr. 360	3
Math 224	3
Agri. Engr. 304	3
Elective	2
	<u>17</u>

Senior Year

<i>First Semester</i>	Credit
Agri. Engr. 524	3
Mech. Engr. 416	3
Mech. Engr. 426	1
Agri. Engr. 523	3
Agri. Engr. 410	3
Soil Physics 532	4
	<u>17</u>

<i>Second Semester</i>	Credit
Agri. Engr. 402	3
Mech. Engr. 441	3
Agri. Engr. 600	3
Agri. Engr. 602	3
Electives	4
	<u>16</u>

* *Supporting Courses: Earth Science 309, 622, 627; ME 105, 440, 564; EE 442, 445; Biology 160; Econ. 310; Plant Science 520; Agri. Engr. 522, 525; IT 293; Math 110, 112, 624.*

* *Electives may be selected from these courses.
(135 Hours Minimum for B.S.)*

OPTION C—EARTH AND ENVIRONMENT SCIENCE

Freshman Year

<i>First Semester</i>	Credit
English 100	3
History 100	3
Mathematics 111	4
Physical Education 101	1
Plant Science 110	3
Chemistry 106	3
Chemistry 116	2
	<u>19</u>

<i>Second Semester</i>	Credit
English 101	3
History 101	3
Mathematics 112	4
Physical Education 102	1
Elective (Major Area)	3
Chemistry 107	3
Chemistry 117	2
	<u>19</u>

Sophomore Year

<i>First Semester</i>	Credit
Humanities 200	3
Elective (Major Area)	4
Soil Science 338	4
Geography 322	3
Earth Science 309	3
	<u>17</u>

<i>Second Semester</i>	Credit
Humanities 201	3
Electives (Major Area)	4
Bacteriology 121	4
Mathematics 224	3
Earth Science 624	3
	<u>17</u>

Junior Year

<i>First Semester</i>	Credit
Chemistry 221	3
Chemistry 223	2
Physics 225	3
Physics 236	1
Earth Science 330	3
Agricultural Engineering 304	3
Plant Science 520	1
	<u>16</u>

<i>Second Semester</i>	Credit
Chemistry 222	3
Chemistry 224	2
Physics 226	3
Physics 236	1
Agricultural Engineering 401	3
Mathematics 240	3
Plant Science 520	1
	<u>16</u>

Senior Year

<i>First Semester</i>	Credit
Earth Science 616	3
Agricultural Engineering 524	3
Crop Science 607	3
Electives (Major Area)	6
	<u>15</u>

PROGRAM IN AGRICULTURAL BUSINESS

The Agricultural Business curriculum in the Department of Plant Science and Technology is mainly designed to serve those majors who are interested in the commercial aspects of Ornamental Horticulture, Nursery Management and Greenhouse Production.



Freshman Year

<i>First Semester</i>	Credit
English 100	3
History 100	3
Botany 140	4
Mathematics 101	3
Agricultural Education 101	1
Air or Military Science or Elective	1
	<u>15</u>

<i>Second Semester</i>	Credit
English 101	3
History 101	3
Zoology 160	4
Mathematics 102	3
Agricultural Education 102	1
Air or Military Science or Elective	1
	<u>15</u>

Sophomore Year

<i>First Semester</i>	Credit
Humanities 200	3
Chemistry 106	3
Chemistry 116	2
Economics 301	3
Soil Science 338	4
Air or Military Science or Elective	2
	<u>17</u>

<i>Second Semester</i>	Credit
Humanities 201	3
Chemistry 107	3
Chemistry 117	2
Agricultural Economics 330	3
Plant Science 110	3
Health Education 200	2
	<u>16</u>

Junior Year

<i>First Semester</i>	Credit
Bacteriology 121	4
Agricultural Economics 332	3
Soil Science 517	3
Plant Science 520	1
Electives (Major Area)	6
	<u>17</u>

<i>Second Semester</i>	Credit
Plant Pathology 530	4
Agricultural Economics 334	3
Earth Science 309	3
Plant Science 520	1
Electives (Major Area)	6
	<u>17</u>

Senior Year

<i>First Semester</i>	Credit
Zoology 468	4
Business Administration 220	3
Bus. Adm. 461	3
Electives (Major Area)	7
	<u>17</u>

<i>Second Semester</i>	Credit
Botany 430	4
Bus. Adm. 422	3
Electives (Major Area)	10
	<u>17</u>

LANDSCAPE ARCHITECTURE

Landscape Architecture is concerned with quality of land use. It includes analysis of environmental and social factors and recommendations for preservation, design, construction and maintenance of developed land areas. The scope of activities of projects vary from broad, regional landscape planning analysis to detailed site planning.

This curriculum is planned to equip the student to deal with a wide range of environmental problems. A sequence of required courses develops understanding of landscape design theory and practice and construction techniques. Elective and optional course offerings provide the student an opportunity to concentrate in an area of individual interest.

The student majoring in landscape architecture may select one of three optional elective tracks: (1) urban advocacy, (2) regional planning, or (3) office practice/governmental administration.

Multiple courses in several major subject areas are sequential. Completing those courses in sequence as listed is required. A student who earns a "D" in his major field may be required to repeat the course.

The following curriculum leads to the Bachelor of Science in Landscape Architecture.

LANDSCAPE ARCHITECTURAL CURRICULUM

Freshman Year

<i>First Semester</i>	Credit
English 100	3
History 100	3
Math 111	4
Botany 140	4
L.A. 220	2
	<hr/>
	16

<i>Second Semester</i>	Credit
English 101	3
History 101	3
Math 112	4
Hort. 202	3
Art 100	3
	<hr/>
	16

Sophomore Year

<i>First Semester</i>	Credit
Humanities 200	3
Hort. 203	3
L.A. 240	3
Arch. Eng. 2210	3
Sociology 100	3
Speech 250	2
	<hr/>
	17

<i>Second Semester</i>	Credit
Geography 200	3
Humanities 201	3
Chemistry 101	3
Chemistry 111	1
Arch. Eng.	3
L.A. 241	3
	<hr/>
	16

Junior Year

<i>First Semester</i>	Credit
L.A. History	3
L.A. 340	4
L.A. 330	4
Soil Science 338	4
	<hr/>
	17

<i>Second Semester</i>	Credit
Geology 309	3
L.A. 341	4
L.A. 331	4
Electives	6
Ag. Eng. 401	3
	<hr/>
	16

Senior Year

<i>First Semester</i>	Credit
Economics 301	3
L.A. 440	4
Arch. Eng. 566	4
L.A. 529	3
Electives	3
	<hr/>
	17

<i>Second Semester</i>	Credit
L.A. 441	4
L.A. 410	2
L.A. 420	2
Electives	7
	<hr/>
	15

OPTIONAL ELECTIVE TRACKS:

Students will be required to elect a minimum of 12 semester hours from one of the optional elective tracks. Five semester hours of free electives are provided under the curriculum. All programs of study shall have the approval of the student's major advisor and the Department.

Urban/Advocacy:

	Credit
Political Science 442	3
Political Science 643	3
Business Administration 610	3
	<hr/>
	Credit
Sociology 313	3
Sociology 505	3
Architectural Engineering 567	3

Regional:

Geography 650	3
Geography 651	3
Earth Science 408	3
Political Science 441	3
Sociology 331	3
Rural Sociology 330	3
Plant Science 618	3
Math 240	3
Environmental Science 625	3

DIRECTORY OF FACULTY

Plant Science and Technology

- Samuel J. Dunn, B.S., Hampton Institute; M.S., Michigan State University; Ph.D., Oregon State University; Professor and Chairperson
- Charles A. Fountain, B.S., Hampton Institute; M.S., Michigan State University; M.L.A., University of California; Ph.D., Michigan State University; Professor
- Godfrey A. Gayle, B.S., North Carolina A&T State University; M.S., Ph.D., N. C. State University at Raleigh; Associate Professor
- Marihelen Glass, B.S., Texas Tech. University; M.S., Ph.D., Texas A&M University
- Ralph J. McCracken, B.A., Earlman College; M.S., Cornell University; Ph.D., Iowa State University; Adjunct Professor

Charles A. Panton, B.S., North Carolina A&T State University; M.S., Purdue University; Ph.D., University of Lund, Sweden; Adjunct Associate Professor

Carol E. Parker, B.S., Cornell University; M.S., Ph.D. University of North Carolina at Chapel Hill; Adjunct Professor

G. Bhaskar Reddy, B.S., M.S., A.P.A.U., India; Ph.D., University of Georgia; Adjunct Associate Professor

Muchha R. Reddy, B.S., Osmania University, India; M.S., A.P., Agricultural University, India; Ph.D., University of Georgia; Adjunct Associate Professor

John F. Robinson, Sr., A.A., Jr. College of Albany, B.A., Louisiana State University; M.L.A., Harvard University; Associate Professor

Abolghasem Shahbazi, B.S., University of Tabriz; M.S., University of California; Ph.D., Pennsylvania State University; Adjunct Assist. Professor

Godfrey A. Uzochukwu, B.S., M.S., Oklahoma State University; Ph.D., University of Nebraska; Assistant Professor

Burleigh C. Webb, B.S., North Carolina A&T State University; M.S., University of Illinois; Ph.D., Michigan State University; Professor

Robert Williamson, B.S., M.S., Howard University; Ph.D., University of Massachusetts; Agricultural Extension Faculty

COURSES

Plant Science

110 Plant Science I
300 Plant Science II
520 Seminar in Plant Science and Technology
618 General Forestry and Ecology

Agricultural Engineering

100 Introduction to Agri. Engr.
113 Agricultural Drawing
114 Home and Farm Maintenance
303 Field Machinery
304 Structures and Environment
401 Surveying, Drainage, and Soil Conservation
402 Farm Power
410 General Hydrology

522 Dairy/Food Engineering
523 Electric Power
524 Agricultural Water Resources Development, Distribution and Quality
525 Farm Shop Organization and Management
600 Conservation, Drainage and Irrigation
601 Advanced Farm Shop
602 Special Problems in Agricultural Engineering
619 Instrumentation and Measurement

Crop Science

305 Principles of Plant Breeding
307 Forage Crops
405 Determining Crop Quality
603 Plant Chemicals
604 Crop Ecology
605 Breeding of Crop Plants
606 Special Problems in Crops
607 Research Design and Analysis
702 Grass Land Ecology
750 Advanced Crop Genetics
751 Advanced Plant Cytogenetics

Earth and Environmental Science

201 The Earth—Man's Environment
309 Elements of Physical Geology
330 Elements of Weather and Climate
408 Aerial Photointerpretation
616 Environmental Planning & Natural Resources Management
622 Environmental Sanitation and Waste Management
624 Earth Science, Geomorphology
625 Earth Resources
626 Aquaculture
627 Strategies of Conservation
704 Problem Solving in Earth Science
705 The Physical Universe
706 Physical Geology
708 Conservation of Natural Resources
709 Seminar In Earth Science

Horticulture

118 Amateur Floriculture
119 The Functional Usage of Plant Materials
334 Plant Propagation
335 Principles of Landscape Design
514 Nursery Management
527 Basic Floral Design
528 Flower Shop Management

529 Landscape Design and Construction I
530 Landscape Design and Construction II
608 Special Problems in Horticulture
610 Commercial Greenhouse Production I
611 Commercial Greenhouse Production II
612 Plant Materials and Landscape Maintenance
613 Plant Materials and Planning Design

Landscape Architecture

101 Landscape Architecture Orientation
202 Plant Materials I
203 Plant Materials II
220 Visual Communication
230 Environmental Ecology
240 Basic Landscape Design I
241 Basic Landscape Design II
310 History of Landscape Architecture
330 Landscape Architectural Construction I
331 Landscape Architectural Construction II
340 Intermediate Landscape Architectural Design I
341 Intermediate Landscape Architectural Design II
400 Planting Design
410 Professional Practice
420 Seminar in Landscape Architecture
440 Advanced Landscape Architectural Design I
441 Advanced Landscape Architectural Design II
529 Advanced Landscape Architectural Construction
601 Environmental Perception and Design Determinants
602 Qualitative Analysis in Landscape Planning
603 Land Use Planning and Management
604 Factors of Physical Design

Soil Science

of Soil Science
516 Soil Pedology
517 Soil Fertility
518 Soil Fertility Laboratory
532 Soil Physics
533 Soil Genesis and Classification
534 Soil Chemistry
609 Special Problems in Soils
710 Soils in North Carolina

COLLEGE OF ARTS AND SCIENCES

Ethel F. Taylor, Acting Dean

OBJECTIVES

The College of Arts and Sciences introduces the student to many fields of human interests and assists him in acquiring knowledge in the fields of liberal arts and sciences. Its primary aim is to provide a liberal and professional education intended to prepare the student to perform in a wide variety of employment situations. In fulfilling its primary purpose, the College endeavors to provide opportunities for the student to acquire the knowledge, perceptions, values, and skills needed for personal development and social usefulness. It also strives through its formal curriculum and co-curriculum programs to achieve the following objectives:

1. To provide courses in general education for all students.
2. To provide courses of instruction for in breadth and in depth studies in the humanities, natural sciences and mathematics, and the social sciences.
3. To provide an opportunity for the student to acquire the tools or methods with which to gather, analyze, and evaluate information as well as the skills to communicate his thinking to others.
4. To provide the opportunity for individual creativity and development through research and other activities which inspire creativity, self-discipline, and self-criticism.
5. To provide an academic base on which individuals may enter graduate areas of specialization.

DEGREES OFFERED

The College of Arts and Sciences is comprised of thirteen departments and programs offering undergraduate majors leading to the Bachelor of Arts or the Bachelor of Science and a Master's program leading to the Master of Arts or the Master of Science in several fields. The Bachelor of Arts degree is offered with major programs of study in Art, Mass Communications, English, French, History, Music, Political Science, Psychology, Sociology, and Speech and Theater Arts. The Bachelor of Science degree is offered with major programs of study in Biology, Chemistry, Computer and Information Sciences, Mathematics, Physics, and Social Work. Many degree programs may be pursued jointly with professional education courses (offered in the School of Education). Graduates of these programs qualify for certification to teach in the secondary schools. In addition, the Mathematics and Physics Departments have joint degree programs with the School of Engineering in Engineering Mathematics and Engineering Physics.

DEGREE REQUIREMENTS

To attain the baccalaureate degree in the College of Arts and Sciences, a student must satisfactorily complete the requirements of his/her major field, the general education studies and a sufficient number of electives to total 124 credits. The minimum scholastic average required for graduation in any department degree program is a 2.0 average in all major courses in addition to the overall grade point average requirement of 2.0.

ACCREDITATION

Programs in the College of Arts and Sciences that are approved by national accreditation organizations are as follows:

—The Department of Chemistry is accredited by the American Chemical Society.

—The undergraduate program in Social Work is approved by the Council on Social Work Education.

—The Teacher Education Programs are accredited by the National Council for Accreditation of Teacher Education.

CAREER OPPORTUNITIES

The curricula of the College prepare students for careers in teaching, research, social work, journalism, radio and television, the creative arts, industry and government. Within the professional curricula, students may pursue studies which lead to careers in law, medicine, dentistry, librarianship, teaching and the ministry.

SEMESTER LOAD LIMIT

The normal schedule is 15-16 semester hours for a semester. No student may register for more than 18 semester hours per semester without permission of the Dean.

ACADEMIC ADVISEMENT

To assist students in meeting graduation requirements, a system of student advisement is provided in all departments. Academic advising is essential for assuring the student that the programs of study he/she is pursuing include the requirements of his/her particular department and desired degree. It assists also in helping students make maximum use of the learning opportunities in the University and in helping them with academic problems.

ADMISSION REQUIREMENTS

Admission requirements for the College of Arts and Sciences are the same as those for the University. Requirements for graduation vary

from department to department, so students must be certain to satisfy departmental requirements. Students are responsible for meeting all academic requirements for graduation.

GENERAL EDUCATION PROGRAM REQUIREMENTS

The purposes of the general education program of the College of Arts and Sciences are to prepare students to enter the specialized part of their university education, and to provide essential elements of a higher education not necessarily included in students' specialties. Accordingly, the general education curriculum of the College of Arts and Sciences is designed to:

1. Insure that students acquire basic skills in communication (reading, writing, speaking, and listening) and mathematics;
2. Develop in students a capacity for sustained analysis that is critical, reasoned, informed, and independent, and acquaint students with the ethical, political, and cultural issue concerning which value judgments must be made and responsibilities assumed;
3. Acquaint students with the use of the scientific method in both the natural and the social sciences and provide students with facts, concepts, and theories concerning the natural and social environments;
4. Impart to students the ideas, values, and events that make up their cultural tradition, familiarize them with the comparable experiences of other cultures, and deepen students' sensitivities through experiencing works of the imagination;
5. Create in students a positive attitude towards their fields of endeavor and improve in them those skills which will be useful for further study and competency in their areas of specialization;

6. Acquaint students with good health practices and creative uses of leisure time and strengthen the students' self-images to enable them to deal constructively with changes in a technological and computerized world while maintaining high moral standards and aesthetic values.

To achieve the above purposes, the College has developed a set of general requirements from which the student must choose sixteen courses in five fields. The general education requirements are listed below:

- I. English Composition
2 courses required
- II. Science (Natural and Physical) and Mathematics
2 courses required
—Chemistry, Botany, Zoology, and Physics,
2 courses required
—Mathematics
- III. Foreign Languages
2 courses required
—Spanish, French, German
- IV. Science (Social & Behavioral)
4 courses required
—Anthropology, Economics, Geography, History, Political Science, and Sociology
- V. Humanities
4 courses required
—Art, English, Humanities, Music, Philosophy, and Speech

Certain courses require specific prerequisites; therefore, each student should select courses with this fact in mind.

Certain majors require specific courses, so each student must be knowledgeable about departmental requirements in selecting these courses.

Students planning to enter teaching fields should be knowledgeable of the semester hour requirements.

Students should be aware also that satisfactory advanced placement scores and/or comparable experiential evidence may be used to satisfy some of the requirements for a baccalaureate degree. Students should consult the chairperson of their respective department(s) for information.

COLLEGE HONORS PROGRAM

The Honors Program in the College of Arts and Sciences is a plan for exceptionally promising and talented students. Honors students take honors courses in the general studies and major fields. Those whose major departments offer honors curricula have opportunities to intensify and increase in-depth knowledge of their major field and its relationship to other fields. Honors students can further enhance their studies through honors seminars, independent research and other special activities. Entering freshmen who are recommended by their high school principal and counselor and who have SAT scores ranging from 800 and above will be eligible to apply. All students who participate must complete an application form and have an overall GPA of at least 3.0 and a departmental GPA of 3.0.

Each Honors Program student will have a committee composed of at least one (1) faculty member from his major department along with the Honors Program Coordinator to assist him in planning his Honors curriculum. During the last semester before graduation, the student's honors committee will review the performance of all participating students who have successfully completed 12 hours of Honors Program work with a minimum grade of "C" in each course to determine if the student should be recommended for graduation from the Honors Program. Students who successfully complete the Honors Program will receive citations as "Honors Program Graduate" on their transcripts and diplomas and will be given special recognition at Commencement.

Interested students should contact the office of the Dean of the College of Arts and Sciences for application information. The formal application must be received at least six (6) weeks prior to the beginning of the semester for which enrollment in the Honors Program is desired.

Department of Art

LeRoy F. Holmes, Jr., Chairperson

The objectives of the Art Department are simple and direct; to guide the students through carefully planned classroom, studio, and working experiences, to develop their aesthetic sensibilities, technical ability and to broaden their general education. This basic preparation lays a foundation for further study, careers as creative artists and art teachers.

DEGREES OFFERED

Art Design—B.A.
Art Painting—B.A.
Art Education—B.S.
* Art, Secondary Education—M.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree programs in the Department of Art is based upon general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

Art Major—The major in art must complete 124 semester hours of University courses. Included in the 124 semester hours are 40/58 hours of art in courses at the 200 level or above. A minimum grade of "C" must be achieved in these courses.

In the advance studio courses, students may expect to purchase certain materials which are not supplied by the Art Department. These materials may cost from \$5.00 to \$45.00 depending on the courses taken by the student.

* See Graduate Bulletin for details.

Suggested Curriculum Guide for a Design Major in Art

Freshman Year

<i>First Semester</i>	Credit
Art 100	3
Art 224	2
Behavioral Science (elective)	3
Physical Education 200	2
English 100	3
Mathematics 101	3
	16
<i>Second Semester</i>	Credit
Art 101	3
Art 225	2
Behavioral Science (elective)	3
English 101	3
Mathematics 102	3
	14

Sophomore Year

<i>First Semester</i>	Credit
Art 226	3
Behavioral Science (elective)	3
Biological Science 100	4
Electives	2
Humanities (elective)	3
Humanities (elective)	3
	18
<i>Second Semester</i>	Credit
Art 222	3
Art 227	3
Art 229	3
Humanities (elective)	3
Physical Science 100	3
Physical Science 110	1
	16

Junior Year

<i>First Semester</i>	Credit
Art 400	2
Art 401	3
Art 459	2
Behavioral Science (elective)	3
Electives	3
Foreign Lang. /French/German	3
	16
<i>Second Semester</i>	Credit
Art 228	3
Art 402	3
Foreign Lang. /French/German	3
Humanities (elective)	3
Engineering Graphics	3
	15

Senior Year

<i>First Semester</i>	Credit
Art 520	2
Art 524	3
Art 405	3
Art 406	3
Art 455	3
	14
<i>Second Semester</i>	Credit
Art 525	3
Art 526	3
Art 456	3
Electives	6
	15

Painting Option

The same as Design Option except Art 528 and 529 are substituted for Art 455 and 456.

Suggested Curriculum Guide for a Teaching Major in Art

Freshman Year

<i>First Semester</i>	Credit
Art 100	3
Education 100	1
English 100	3
History 100	3
Mathematics 101	3
Physical Education	1
Electives	2
	16
<i>Second Semester</i>	Credit
Art 101	3
Electives	3
English 101	3
History 101	3
Mathematics 102	3
Physical Education 200	2
	17

Sophomore Year

<i>First Semester</i>	Credit
Art 224	2
Art 226	3
Education 300	2
Foreign Language	3
Humanities 200	3
Psychology 320	3
Physical Education	1
	17
<i>Second Semester</i>	Credit
Art 225	2
Art 227	3
Education 301	2
Foreign Lang. /French/German	3
Humanities 201	3
Electives	2
	15

Junior Year

<i>First Semester</i>	Credit
Art 400	2
Art 405	3
Physical Science 100	3
Physical Science 110	1
Art 600	3
Electives	3
	<hr/> 15

<i>Second Semester</i>	Credit
Art 229	3
Art 401	3
Biological Science 100	4
Education 400	3
Speech 250	3
	<hr/> 16

Senior Year

<i>First Semester</i>	Credit
Art 454	3
Art 459	2
Art 520	2
Art 524	3
Education 436	3
	<hr/> 13

<i>Second Semester</i>	Credit
Education 500	3
Education 525	3
Education 560	6
Education 624	3
	<hr/> 15

Teaching Major in Art—The teaching major in art must complete a minimum of 124 semester hours of University courses. Included in these 124 hours are thirty semester hours of art courses at the 200 level or above with grades of "C" or better.

CAREER OPPORTUNITIES

The programs offered by the Department of Art prepare students for such careers as commercial artists, draftsmen, illustrators, freelance artists, directors and supervisors of art agencies, art teachers, and art supervisors.

SECOND MAJOR REQUIREMENT

Art Education majors in accordance with State Department of Public Instruction Guidelines relative to the "Second Major Requirement" should take at least nine hours from the following group of courses.

- Art 228—Color Theory—3 Hrs.
- Art 406—Painting Techniques—3 Hrs.
- Art 525—Lithography and Serigraphy—3 Hrs.
- Art 526—Senior Project—3 Hrs.
- Art 529—Painting II—3 Hrs.

DIRECTORY OF FACULTY AND COURSES

Art

- LeRoy F. Holmes, Jr., A.B., Howard University; A.M., Harvard University; Associate Professor and Chairperson
- Theresa A. McGeady, A.B., Immaculata College; M.A., M.F.A., University of Notre Dame; Ph.D., Ohio University; Associate Professor
- James E. McCoy, B.S., North Carolina College; M.A., Columbia University; Assistant Professor
- Stephanie A. Santmyers, B.F.A., Alfred University; M.S., Illinois State University; M.F.A., University of North Carolina at Greensboro; Assistant Professor
- Henry E. Sumpter, B.A., North Carolina Agricultural & Technical State University; M.F.A., University of North Carolina at Greensboro; Assistant Professor

Courses

- 100 Basic Drawing and Composition
- 101 Lettering and Poster Design
- 220 Graphic Presentation I
- 221 Graphic Presentation II
- 222 Watercolor
- 224 Art Appreciation
- 225 An Introduction to the History of Art

- 226 Design I
- 227 Design II
- 228 Color Theory
- 229 Anatomy and Figure Drawing
- 400 Renaissance Art
- 401 Ceramics
- 402 Basic Sculpture
- 403 Jewelry and Metalwork
- 405 Materials and Techniques
- 406 Painting Techniques
- 450 Advertising Design I
- 451 Advertising Design II
- 452 Commercial Art
- 453 Typography
- 454 General Crafts
- 455 Fabric Design and Basic Weaving
- 456 Fabric Painting and Weaving
- 457 Stage Design and Marionette Production I
- 458 Stage Design and Marionette Production II
- 459 Baroque and Rococo Art
- 520 Modern Art
- 524 Introduction to Graphic Arts
- 525 Lithography and Serigraphy
- 526 Senior Project
- 528 Painting I
- 529 Painting II
- 600 Public School Art
- 602 Seminar in Art History
- 603 Studio Techniques
- 604 Ceramic Workshop
- 605 Printmaking
- 606 Sculpture
- 607 Project Seminar
- 608 Arts and Crafts

Department of Biology

A. James Hicks, Chairperson

PROGRAM OBJECTIVES

The objectives of the Biology Department are:

- To provide the opportunity for an academic background in the life sciences as a part of the general education for the student population at the University.
- To prepare students to teach biology;

- To prepare students to meet basic admission requirements of graduate and professional schools (i.e. medical, dental and veterinary science);
- To prepare professional biologists;
- To provide cognate courses for students majoring in or receiving certification in other fields, including but not limited to agricultural sciences, home economics, nursing, horticulture, and physical education.

DEGREES OFFERED

Biology (Professional)—B.S.
Biology (Secondary Education)—B.S.

- * Biology—M.S.
- * Biology (Secondary Education)—M.S.

The curricula of the two undergraduate programs listed above are similarly structured in the freshman and sophomore years. The course requirements of the upper level of these programs vary in that each is geared toward its specific goal. Students have the option to complete both the professional and secondary education sequences.

Curriculum requirements at the graduate level include selected courses in cell and molecular biology, organismal, population biology, and biochemistry. Students desiring a graduate degree in education also follow prescribed education course requirements.

* See the *Bulletin of the Graduate School*

GENERAL PROGRAM REQUIREMENTS

The admission of students to the degree programs in the Department of Biology is based upon the general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

Biology Major—Biology majors are required to complete a minimum of 125 hours for graduation. In the "preprofessional sequence", the student is required to complete a minimum of 39 semester hours of biology and 45 semester hours of supporting courses. The remaining courses satisfy the University's general education requirements.

Teaching Major in Biology—Majors following the "teacher education sequence" are required to complete a minimum of 130 semester hours of University courses. Included in these 130 hours are a minimum of 34 semester hours of biology and 69 semester hours of supporting courses. The remaining courses satisfy the University's general education requirements. A student may also be expected to complete a one semester practicum in the department.

ENRICHMENT PROGRAMS

Enrichment programs designed to increase the knowledge and competitiveness of biology majors are as follows:

- Departmental Seminars (including the Artis P. Graves Lecture Series and the MARC Honors Colloquium). Researchers from industry, medical institutions, research laboratories and universities deliver talks on current findings on various life science topics. Open to all students.
- Health Careers Academic Advancement Program (HCAAP) and Health Careers Opportunity Program (HCOP). HCAAP is in association with the N.C. Health Manpower Development/UNC-Chapel Hill and HCOP is administered through East Carolina

School of Medicine. Both HCAAP and HCOP are academic skills improvement programs for persons interested in health fields. Sophomores through seniors may apply. Consult the health careers advisor.

- Selected students may gain research experience through participation in the Minority Biomedical Research Support Program (M.B.R.S.), and other funded faculty research.
- Student Clubs. Biology majors are strongly encouraged to participate in the Biology Club and/or the Health Careers Club. Open to all majors. Consult the respective Club advisors.

ACCREDITATION/FEDERAL SUPPORT

All Teacher Education Programs are accredited by the National Council for Accreditation of Teacher Education and approved by the North Carolina State Department of Public Instruction.

As is the standard in quality programs nationally, the department receives training and research support from Federal, State and private funding agencies.

ENRICHMENT FACILITY

- Herbarium (NCATG). A collection of approximately 6,000 specimens, several dozen of which were collected in the 1800's. NCATG is registered internationally.
- Reading Room. An enrichment area containing references, color slidetapes, video cassette materials, microcomputers and software.
- Atrium/Museum. Valuable small mammal, bird and other collections are exhibited in the core of the building.

RESEARCH

- Biotechnology
- Cell & Molecular Biology
- Endocrinology/Biochemistry
- Developmental Biology/Electron Microscopy
- Bacteriology/Biochemistry
- Virology/Immunology
- Parasitology/Medical Entomology
- Environmental Biology/Ecology
- Experimental Plant Taxonomy/Floristics
- Plant and Physiology
- and Others

CAREER OPPORTUNITIES

Due to the depth of required courses in biology and the breadth of support courses in the quantitative sciences, languages, humanities, the arts and others, Biology majors qualify for employment in many fields. Satisfying careers await successful graduates in industry, government and education. Highly motivated graduates in biology frequently compete successfully for entry into professional (medicine, dentistry, pharmacy, allied and public health, etc.), and graduate schools. Jobs in technical and pharmaceutical sales, museum curation, hospital administration, environmental law, and teacher education are merely a sample of career opportunities available to graduates in biology.

Suggested Curriculum Guide for A Biology Major

Bachelor of Science

1. Preprofessional Sequence

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Math 111	4
Physical Education 101	1
Biology 160	4
Chemistry 106	3
Chemistry 116	2
	<hr/> 17

Second Semester

English 101	3
Math 112	4
Physical Education 102	1
Biology 140	4
Chemistry 107	3
Chemistry 117	2
	<hr/> 17

Sophomore Year

<i>First Semester</i>	Credit
Chemistry 221	3
Chemistry 223	2
Education 300	2
Speech 250	3
Biology 260	4
History 100	3
	<hr/> 17

Second Semester

Chemistry 222	3
Chemistry 224	2
Health Education 200	2
Biology 121	4
History 101	3
Education 301	2
	<hr/> 16

Junior Year

<i>First Semester</i>	Credit
Physics 225	3
Physics 235	1
French 100 or German 102	3
Biology 465	4
Biology 561	4
	<hr/> 15

Second Semester

Biology 466	3
French 101 or German 103	3
Biology 562	4
Physics 226	3
Physics 236	1
Electives	3
	<hr/> 17

Senior Year

<i>First Semester</i>	Credit
Humanities 200	3
Psychology 320	3
Biology 568	1
Biology Elective	3
Electives	3
	<hr/> 13

Second Semester

Humanities 201	3
Biology 569	1
Biology Elective	6
Electives	3
	<hr/> 13

2. Teacher Education Sequence

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Math 111	4
Physical Education 101	1
Biology 160	4
Chemistry 106	3
Chemistry 116	2
	<hr/> 17

Second Semester

English 101	3
Math 112	4
Biology 140	4
Chemistry 107	3
Chemistry 117	2
Physical Education 102	1
	<hr/>
	17

Sophomore Year

<i>First Semester</i>	Credit
Biology 260	4
Chemistry 221	3
Chemistry 223	2
Education 300	2
Speech 250	3
History 100	3
	<hr/> 17

Second Semester

Biology 121	4
Psychology 320	3
Health Education 200	2
Education 301	2
Humanities 200	3
History 101	3
	<hr/>
	17

Junior Year

<i>First Semester</i>	Credit
Education 400	3
French 100 or German 102	3
Physics 225	3
Physics 235	1
Humanities 201	3
Biology 561	4
	<hr/> 17

Second Semester

Biology 400	3
Biology 466	3
French 101 or	3
German 103	
Physics 226	3
Physics 236	1
Biology 562	4
	<hr/>
	17

Senior Year

<i>First Semester</i>	Credit
Psychology 436	3
Biology 568	1
Biology Elective	3
Education 624	3
Free Electives	6
	<hr/> 16

<i>Second Semester</i>	Credit
Education 500	3
Education 535	3
Education 560	6
	<hr/> 12

DIRECTORY OF FACULTY AND COURSES

Biology

David W. Aldridge, B.S., M.S., University of Texas, Arlington; Ph.D., Syracuse University; Postdoc., Woods Hole Marine Biol. Labs.; Associate Professor

Jerry Bennett, B.S., Tougaloo College; M.S., Atlanta University; Ph.D., Iowa State University; Associate Professor

Susan Carty, B.S., S.U.N.Y.—Stony Brook; M.S., University of Oklahoma; Ph.D., Texas A&M University; Visiting Assistant Professor

Doretha B. Foushee, B.S., Shaw, University; M.S., North Carolina Central University; Ph.D., University of Maryland-College Park; Assistant Professor

A. James Hicks, B.S., Tougaloo College; Ph.D., University of Illinois, Urbana; Postdoc., Mo. Botanical Gardens, St. Louis; Extramural Assoc., N.I.H., Bethesda; Professor and Chairperson

Alfred Hill, Jr., B.S., Prairie View College; M.S., Colorado State University; Ph.D., Kansas State University; Professor

Thomas L. Jordan, B.A., Rockhurst of Wisconsin, Madison; Postdoc., Univ. Wash.-Seattle; Associate Professor

Thomas E. McFadden, B.S., M.S., North Carolina Central University; Assistant Professor

William H. Mitchell, B.S., West Virginia State College; M.A., Purdue University; M.S., University of NC at Greensboro; Assistant Professor

T.E. Joan Robinson, B.S., Federal City College; M.S., Ph.D., Howard University; Postdoc., Mayo Clinic,

Rochester, MN; Postdoc., National Institutes of Health, Bethesda, MD; Assistant Professor

Joseph J. White, B.S., M.S., North Carolina College, Durham; Ph.D., University of Illinois, Urbana; Professor

James A. Williams, A.B., Talladega College; M.S., Atlanta University; Ph.D., Brown University; Professor

**Courses

- 100 Biological Science
- 120 Microbiology
- 121 General Microbiology
- 140 General Botany
- 160 General Zoology
- 260 Comparative Evolution of the Vertebrates
- 261 Sociobiology
- 400 Field Biology
- 420 Food Microbiology
- 421 Soil Microbiology
- 430 Plant Taxonomy
- 432 Plant Physiology
- 460 Advanced Invertebrate Zoology
- 461 Human Anatomy and Physiology
- 465 Histology
- 466 Principle of Genetics
- 467 General Entomology
- 468 Economic Entomology
- 469 Human Anatomy
- 530 Plant Pathology
- 560 Human Physiology
- 561 Vertebrate Embryology
- 562 Introductory Cell Physiology
- 568 Seminar in Biology
- 569 Seminar in Biology
- 571 Principles and Practices of Immunology
- 600 General Science for Elementary Teachers
- 640 Plant Biology
- 642 Special Problems in Botany
- 660 Special Problems in Zoology
- 661 Mammalian Biology
- 662 Biology of Sex
- 663 Cytology
- 664 Histo-Chemical Technique
- 665 Nature Study
- 666 Experimental Embryology
- 667 Animal Biology
- 668 Animal Behavior
- 669 Recent Advances in Cell Biology

*See *Bulletin of the Graduate School*

** Consult the Department for a list of recommended electives, both major and non-major.

Department of Chemistry

Walter Wright, Chairperson

OBJECTIVES

The objectives of the Chemistry Department are:

1. To prepare chemistry majors for graduate study in chemistry or other chemistry-based sciences;
2. To prepare majors for admittance to medical, dental, and other professional schools;
3. To prepare majors for careers as professional chemists;
4. To prepare majors to teach chemistry at the secondary school level;
5. To provide majors in other departments with a functional understanding of chemistry commensurate with the needs of their chosen field;
6. To provide all students served by the department with an insight into the nature of scientific investigations and the scientific enterprise in general;
7. To offer for graduate students learning experiences and research leading to a M.S. in Chemistry;
8. To offer learning experiences and research leading to a M.S. in education with a concentration in Chemistry;
9. To share the resources (human and physical) of the department with the local and academic community through cooperative programs, workshops, seminars, course offerings, etc.;
10. To contribute to the extension of basic knowledge in Chemistry and related sciences through applied and basic research, educational experimentation, publications, etc.

DEGREES OFFERED

Chemistry—B.S., M.S.*
Chemistry, Secondary
Education—B.S., M.S.*
Chemistry—B.S., M.S.

GENERAL PROGRAM REQUIREMENTS

Chemistry Major—the professional major in chemistry must complete 124 semester hours of University courses. The student may select one of two options in order to complete the professional major. The options are: The American Chemical Society (ACS) Certified Program or the Pre-Health Program. The ACS program requires that the student complete 44 semester hours in basic chemistry courses and six to eight hours in advanced chemistry courses. The Pre-Health Program requires the student to complete 44 semester hours in basic chemistry courses and 16 semester hours of basic biology courses. A minimum grade of "C" must be achieved in all basic chemistry courses.

Teaching Major in Chemistry—The teaching major in chemistry must complete a minimum of 124 semester hours of University courses. Included in these 124 hours are 41 semester hours of basic chemistry courses. A minimum grade of "C" must be achieved in all basic chemistry courses.

Bachelor of Science/Master of Science in Chemistry—This curricula is identical in the first two years to the professional major's program leading to the Bachelor of Science degree. It is designed to enable talented undergraduate students to obtain the B.S. and M.S. degrees, in Chemistry, during a five year period of study and research. Any rising junior in chemistry with a grade-point average of 3.0 in Chemistry and 2.7 overall average is eligible.

ACCREDITATION

The professional curriculum (ACS Certified Program) is accredited by the American Chemical Society. All Teacher Education Programs are accredited by the National Council

for Accreditation of Teacher Education and approved by the North Carolina State Department of Public Instruction.

CAREER OPPORTUNITIES

B.S. level graduates in chemistry qualify for employment in many fields. There are many career opportunities for chemists in education, government, and industry.

In industry, the chemistry graduate with a B.S. degree may be employed in manufacturing-plant management, research and development, product development, technical sales, marketing, etc. B.S. level chemists work in research at federal, state, municipal, and university laboratories.

The B.S. degree program prepares students to pursue graduate study in chemistry or other chemistry-based sciences (biochemistry, pharmacology, physiology, chemical physics, material science, etc.), medicine, dentistry, and other health professional areas.

Suggested Curriculum Guide for Professional Majors in Chemistry

A. Professional Curriculum (ACS Certified)

Freshman Year

<i>First Semester</i>	Credit
Chemistry 106	3
Chemistry 108	1
Chemistry 116	2
English 100	3
History 100	3
Mathematics 110	4
Physical Education ¹	1
	<hr/> 17

<i>Second Semester</i>	Credit
Chemistry 107	3
Chemistry 117	2
English 101	3
History 101	3
Mathematics 131	4
Physical Education ¹	1
	<hr/> 16

¹ Health Education 200 may be substituted for the two courses in Physical Education.

Sophomore Year

<i>First Semester</i>	Credit
Chemistry 221	3
Chemistry 223	2
Mathematics 132	4
Physics 221	3
Physics 231	2
German 102 or Russian 106	3
	<hr/> 17

<i>Second Semester</i>	Credit
Chemistry 222	3
Chemistry 231	3
Chemistry 232	2
Physics 222	3
Physics 232	2
German 103 or Russian 107	3
	<hr/> 16

Junior Year

<i>First Semester</i>	Credit
Chemistry 441	3
Chemistry 224	2
Mathematics 231	4
Humanities 200	3
Zoology 160	4
	<hr/> 16

<i>Second Semester</i>	Credit
Chemistry 442	3
Chemistry 443	1
Chemistry 511	3
Humanities 201	3
Botany 140 ²	4
Elective	3
	<hr/> 17

² A biology course for which Zoology 160 is a prerequisite may be substituted for Botany 140.

Senior Year

<i>First Semester</i>	Credit
Chemistry 431	3
Chemistry 432	2
Chemistry 444	1
Chemistry 545	3
Adv. Chem. Elective ³	3-4
Elective	3
	<hr/> 15-16

<i>Second Semester</i>	Credit
Adv. Chem. Elective ³	3-5
Electives	9
	<hr/> 12-14

³ To be selected from Chemistry 610, 611, 621, 624, 631, 641, 643, 651, and 503 or 504.

B. Professional Curriculum (Pre-Health)

The Program is the same during the first two years as that of the ACS Certified Curriculum.

Junior Year

<i>First Semester</i>	Credit
Chemistry 441	3
Chemistry 224	2
Zoology 160	4
Humanities 200	3
Electives	3
	<u>15</u>

<i>Second Semester</i>	Credit
Chemistry 442	3
Chemistry 443	1
Chemistry 511	3
Zoology 260	4
Humanities 201	3
Electives	3
	<u>17</u>

Senior Year

<i>First Semester</i>	Credit
Chemistry 431	3
Chemistry 432	2
Chemistry 444	1
Chemistry 545	3
Zoology 561	4
Electives	3
	<u>16</u>

<i>Second Semester</i>	Credit
Psychology 562	4
Electives	8
	<u>12</u>

C. Suggested Curriculum Guide for a Teaching Major in Chemistry

The program is the same during the first two years as that of the professional curriculum except Personal Hygiene (P.E. 200) is required.

Junior Year

<i>First Semester</i>	Credit
Chemistry 441	3
Chemistry 224	2
Mathematics 231	4
Zoology 160	4
Education 300	2
Humanities 200	3
	<u>18</u>

<i>Second Semester</i>	Credit
Chemistry 442	3
Chemistry 443	1
Chemistry 511	3
Botany 140 ²	4
Education 301	2
Speech 250	2
Humanities 201	3
	<u>18</u>

² A biology course for which Zoology 160 is a prerequisite may be substituted for Botany 140.

Senior Year

<i>First Semester</i>	Credit
Chemistry 431	3
Chemistry 432	2
Chemistry 444	1
Education 400	3
Education 436	3
Psychology 320	3
Earth Science 309	3
	<u>18</u>

<i>Second Semester</i>	Credit
Education 500	3
Education 535	3
Education 560	6
	<u>12</u>

D. B.S./M.S. Curricula

Additional required Chemistry Courses beyond the B.S.-level are Chemistry 611, 701, 702, 722, 732, 743 or 749, 799, and 5 hours from among 600 and 700 level Chemistry courses.

DIRECTORY OF FACULTY AND COURSES

Chemistry

Evans Booker, B.S., St. Augustine's College; M.S., Tuskegee Institute; Associate Professor
Naiter M. Chopra, B.S., M.S., University of Punjab; Ph.D., University of Dublin; Professor
Etta C. Gravely, B.S., Howard University; M.S., North Carolina A&T State; Ed.D., UNC-Greensboro; Assistant Professor
Vallie Guthrie, B.S., North Carolina A&T State University; M.S., Fisk University; Ed.D., American University; Associate Professor
Kenneth W. Hicks, B.S., Miami University (Ohio); Ph.D., Howard University; Professor
Curtis Higginbotham, B.S., North Carolina Central University; M.S.,

North Carolina A&T State University; Instructor
Jothi V. Kumar, B.S., Annamala University; Ph.D., Kansas State University; Associate Professor
Claude N. Lamb, B.S., Mount Union College; M.S., North Carolina Central University; Ph.D., Howard University; Assistant Professor
Arthur M. Stevens, B.S., Langston University; M.S., Oklahoma University; Associate Professor
Alex N. Williamson, B.S., Jackson State University; Ph.D., University of Illinois at Urbana; Associate Professor
Walter G. Wright, B.S., M.S., North Carolina College; Ph.D., New York University; Professor and Chairperson

Courses

099 Introductory Chemistry
100 Physical Science
101 General Chemistry I
102 General Chemistry II
104 General Chemistry IV
105 General Chemistry V
106 General Chemistry VI
107 General Chemistry VII
108 Chemistry Orientation
110 Physical Science Laboratory
111 General Chemistry I Laboratory
112 General Chemistry II Laboratory
114 General Chemistry IV Laboratory
115 General Chemistry V Laboratory
116 General Chemistry VI Laboratory
117 General Chemistry VII Laboratory
210 Cooperative Experience I
221 Organic Chemistry I
222 Organic Chemistry II
223 Organic Chemistry I Laboratory
224 Organic Chemistry II Laboratory
231 Quantitative Analysis I
232 Quantitative Analysis I Laboratory
251 Elementary Biochemistry
252 Elementary Biochemistry Laboratory
301 Current Trends in Chemistry
310 Cooperative Experience II
410 Cooperative Experience III
431 Quantitative Analysis II
432 Quantitative Analysis II Laboratory

- 441 Physical Chemistry I
- 442 Physical Chemistry II
- 443 Physical Chemistry II
Laboratory
- 444 Physical Chemistry II
Laboratory
- 503 Chemical Research
- 504 Independent Study
- 511 Inorganic Chemistry
- 545 Physical Chemistry III
- 610 Inorganic Synthesis
- 611 Advanced Inorganic Chemistry
- 621 Intermediate Organic
Chemistry
- 631 Electroanalytical Chemistry
- 641 Radiochemistry
- 642 Radioisotope Techniques and
Applications
- 643 Introduction to Quantum
Mechanics
- 651 General Biochemistry

Course descriptions are available upon request from the Dean of the School.

Department of English

Jimmy L. Williams
Chairperson

OBJECTIVES

The objectives of the English Department are: to provide instruction in reading and writing skills, the humanities, linguistics and literature; to prepare English majors and minors to teach and to pursue graduate training in English and other professions; and to train students in professional writing.

DEGREES OFFERED

English, Professional—B.A.
English, Secondary Education—
B.S.

* English, Secondary Education—
M.S.

* English and Afro-American
Literature—M.A.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate programs in the Department of English is based upon the general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

Professional English Major—The professional English major must complete 125 semester hours of University courses. Included in the 125 semester hours are 42 hours of English at the 200 level or above for the professional major. A minimum grade of "C" must be achieved in these courses.

Teaching Major in English—The teaching major in English must complete a minimum of 126 semester hours of University courses. Included in these 126 hours are 42 semester hours of English courses at the 200 level or above with grades of "C" or better.

The Minor in English (teaching and non-teaching)—Students desiring a minor in English must complete 24 semester hours in English at the 200 level or above. The courses are English 210, 220, 221, 300, 410, 430, 431, and 450.

*See the Graduate Bulletin for descriptions of these programs.

CAREER OPPORTUNITIES

A degree in English prepares students to teach, to conduct research, to pursue graduate and professional degrees (such as law and library science), and to work in government, business editing and numerous other jobs requiring mastery of the language.

Suggested Curriculum Guide For Professional English Majors Bachelor of Arts

Freshman Year

	1st Sem. Cr. Hrs.	2nd Sem. Cr. Hrs.
English 100, 101	3	3
* Math 101, 102	3	3
Soc. Sci. 100, 101	3	3
Bio. Sci. 100	4	—
Phy. Sci. 100, 110	—	4
P.E. 101, 102	1	1
English 102	2	—
English 210	—	3
	16	17

Sophomore Year

**Foreign Language	3	3
Humanities 200, 201	3	3
Speech 250	3	—
English 220, 221	3	3
Psy. 320	3	—
Electives	2	6
	17	15

Junior Year

English 300	3	—
English 500	3	—
English 501	—	3
English 401	—	3
English 430, 431	3	3
Electives	3	6
English Elective	3	—
	15	15

Senior Year

English 450	3	—
English 410	—	3
English 435	3	—
English 436	3	—
Electives	6	12
	15	15

* Students having to take Math. 100 (a remedial course) still must complete Math. 101 & 102 or their equivalent.

** French, Spanish or German through Intermediate level.

Suggested Curriculum Guide For A Teaching Major in English Bachelor of Science

Freshman Year

	1st Sem. Cr. Hrs.	2nd Sem. Cr. Hrs.
English 100, 101	3	3
* Math 101, 102	3	3
Soc. Sci. 100, 101	3	3
Bio. Sci. 100	4	—
Phy. Sci. 100, 110	—	4
P.E. 101, 102	1	1
English 102	2	—
English 210	—	3
	16	17

* Students having to take Math. 100 (a remedial course) still must complete Math. 101 & 102 or their equivalent.

Sophomore Year

English 220, 221	3	3
***Foreign Language	3	3
Humanities 200, 201	3	3
Speech 250	3	3
Psychology 320	3	—
Education 300	—	2
English 425	—	3
Electives	3	—
	15	17

Junior Year

English 430, 431	3	3
English 300	3	—
English 501	—	3
English 401	—	3
English 436 or 435	3	—
Education 301	2	—
Education 400	—	3
English 401	—	3
Education 526	3	—
Electives	2	2
	16	17

Senior Year

English 450	3	—
English 500	3	—
† English 627	—	3
Education 436	3	—
† Education 500	—	3
† Education 560	—	6
Education 637	3	—
Electives	3	—
	15	12

*** Acceptable courses: French 300, 301; Spanish 320, 321; German 422, 423. Eligibility to enroll in any one of these is established by placement test or by successful completion of elementary level of appropriate language.

DIRECTORY OF FACULTY AND COURSES

English

Jimmy L. Williams, B.A., Clark College; M.A., Washington University; Ph.D., Indiana University; Professor and Chairperson
 Brian Benson, A.B., Guilford College; M.A., University of North Carolina at Greensboro; Ph.D., University of South Carolina; Professor
 John Crawford, B.S., North Carolina A. and T. State University; M.S., University of Iowa; Ph.D., University of Colorado; Professor
 Michael Greene, B.A., Duke University; M.A., Ph.D., Indiana University; Professor

Norman Jarrard, A.B., Salem College; M.A., University of North Carolina at Chapel Hill; Ph.D., University of Texas; Professor
 Robert Levine, B.A., Queens College of the City University of New York; M.A., Ph.D., Cornell University; Professor
 Ethel Taylor, A.B., Spelman College; M.A., Atlanta University; Ph.D., Indiana University; Professor
 Sandra Alexander, B.S., North Carolina A. and T. State University; M.A., Harvard University; Ph.D., University of Pittsburgh; Associate Professor
 Irma Cunningham, B.A., LeMoyne-Owen College; M.A., Indiana University; Ph.D., The University of Michigan; Associate Professor
 Sally Ferguson, B.A., Norfolk State College; M.A., Ph.D., The Ohio State University; Associate Professor
 Samuel Garren, B.A., Davidson College; M.A., Ph.D., Louisiana State University; Associate Professor
 Lucy Bolden, B.A., Bennett College; M.S., North Carolina A. and T. State University; Assistant Professor
 Mary Huges Brookhart, B.A., Kansas University; M.A.T., The Johns Hopkins University; Ph.D., University of North Carolina; Assistant Professor
 Jane Gibson Brown, B.A., Converse College; M.A. Vanderbilt University; Ph.D., University of Dallas; Assistant Professor
 Catherine Clifton, B.A., University of New Mexico; M.A., Arizona State University; Assistant Professor
 Opal Hawkins, B.S., Hampton Institute; M.S., University of Georgetown; Ph.D., University of North Carolina at Chapel Hill; Assistant Professor
 Annie Herbin, B.S., M.S., North Carolina A. and T. State University; Assistant Professor
 Elon Kulii, A.B., Winston-Salem State University; M.S., North Carolina A. and T. State University; Ph.D., Indiana University; Associate Professor
 Virginia Whatley Smith, B.S., North Carolina A. and T. State University; M.A., Boston University; Lecturer

Courses

General Education Courses

099 Basic Reading and Writing Skills
 100 & 101 Ideas and Their Expression I & II
 102 Developmental Reading
 205 Topics in Literature

Courses in Humanities

200 Survey of Humanities I
 201 Survey of Humanities II
 202 The Humanities in America
 203 Humanities Perspectives of the South
 204 Topics in Humanities: A Multidisciplinary Course
 420 Humanities III, Great Ideas of World Civilization

Language, Composition, and Writing

260 Expository Writing I
 261 Expository Writing II
 300 Advanced Composition
 305 Grammar, Literature, and Composition for Pre-Professional Students
 310 Introductory Linguistics
 331 Writing for Science and Technology
 445 Independent Study in English
 450 Advanced English Grammar
 480 Editing
 490 Professional Writing Internship
 501 Introduction to the History of the English Language.

Literature

210 Introduction to Literary Studies
 220 & 221 English Literature I & II
 400 & 401 Survey of Dramatic Literature I & II
 410 Shakespeare
 425 World Literature I
 430 American Literature I
 431 American Literature II
 433 Survey of Afro-American Literature
 435 The Novel
 436 Modern Poetry
 475 British and American Literary History
 500 Literary Research and Criticism

Advanced Undergraduate and Graduate

- 600 Language Variations in American English
- 603 Introduction to Folklore
- 620 Elizabethan Drama
- 626 Children's Literature
- 627 Literature for Adolescents
- 628 The American Novel
- 650 Afro-American Folklore
- 652 Afro-American Drama
- 654 Afro-American Novel I
- 656 Afro-American Novel II
- 658 Afro-American Poetry I
- 660 History of American Ideas
- 672 Independent Study in English

Department of Foreign Languages

Helen G. LeBlanc Disher,
Chairperson

OBJECTIVES

The objectives of the Foreign Language Department are to (1) develop facility in the listening, speaking, reading and writing of the foreign languages; (2) develop a better knowledge of the foreign cultures and an appreciable awareness of one's own culture; (3) create a spirit of international understanding that will result in respectable attitudes toward individuals and national groups; (4) prepare students as teachers of foreign languages for employment in secondary schools; (5) prepare and encourage students to continue further study and research in the major areas, foreign language literature and education; (6) provide students with experiences to develop communicative skills and competence requisite for personal fulfillment and challenging careers in which the foreign language study will be in full use or an asset.

DEGREES OFFERED

French—B.A.
French, Education—B.S.
French—M.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree programs in the Department of Foreign Languages is based upon the general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

French—B.A. (Non-Teaching Major)—The curriculum in this area requires the student to complete a minimum of 124 semester hours of University courses. Included in the 124 hours are 36 semester hours of French in courses beyond the elementary level.

French—B.S. (Teaching Major)—The curriculum for the teaching major in French requires that a student complete the courses and regulations as outlined by the Department of Education for certification at the secondary school level. A student must complete a minimum of 124 semester hours of University courses. Included in the 124 hours are 36 semester hours of French in courses beyond the elementary level.

Students who have completed one unit of language in high school or who have no knowledge of a foreign language are to enroll in an elementary language course. For those students presenting two units or more of high school credits, French 300 and French 301, or Spanish 320 and Spanish 321 are required.

A minor may be achieved in French and Spanish by students who complete a minimum of 24 semester hours in Spanish or French at the 300 level or above.

ACCREDITATION

All Teacher Education Programs are accredited by the National Council for Accreditation of Teacher Education and approved by the North Carolina State Department of Public Instruction.

CAREER OPPORTUNITIES

In this time of growing internationalism, a degree in foreign languages has a high level of importance in many professional careers. For the language major, chances of employment in areas of government service, military service, teaching, international travel, law, business, industry and mass communications, to name but a few, are greatly enhanced by the training in foreign languages.

CURRICULUM GUIDE FOR FRENCH, NON-TEACHING

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Mathematics 101	3
Social Science 100	3
Biological Science 100	4
French 300	3
	16

<i>Second Semester</i>	Credit
English 101	3
Mathematics 102	3
Social Science 101	3
Physical Science 100	4
French 301	3
	16

Sophmore Year

<i>First Semester</i>	Credit
Speech 250	3
Humanities 200	3
French 410	3
French 415	3
Psychology 320	3
Spanish 104	3
	18

<i>Second Semester</i>	Credit
Humanities 201	3
French 411	3
French 416	3
Spanish 105	3
Physical Education 200	2
Elective or Minor	3
	17

Junior Year

<i>First Semester</i>	Credit
French 400	3
French 505*	3
Spanish 320	3
Geography 210	3
Elective or Minor	3
	<hr/> 15

<i>Second Semester</i>	Credit
French 417	3
French 505 or 506	3
Spanish 321	3
Electives or Minor	6
	<hr/> 15

Senior Year

<i>First Semester</i>	Credit
French 508	3
French Elective	3
German 102	3
Electives or Minor	6
	<hr/> 15

<i>Second Semester</i>	Credit
French Electives	6
German 103	3
Electives or Minor	3
	<hr/> 12

Minimum Total Hours Required 124
 Minimum Total French Hours
 Required 36

**CURRICULUM GUIDE FOR
 FRENCH, TEACHING**

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Mathematics 3101	3
Social Science 100	3
Biological Science 100	4
French 300	3
	<hr/> 16

<i>Second Semester</i>	Credit
English 101	3
Mathematics 102	3
Social Science 101	3
Physical Science 100	4
French 301	3
	<hr/> 16

Sophomore Year

<i>First Semester</i>	Credit
Speech 250	3
Humanities 200	3
French 410	3
P.E. 200	2
Spanish 104	3
French 415	3
	<hr/> 17

<i>Second Semester</i>	Credit
Humanities 201	3
French 411	3
French 416	3
Psychology 320	3
Spanish 105	3
Education 300	2
	<hr/> 17

Junior Year

<i>First Semester</i>	Credit
French 400	3
French 505 or 506	3
Education 301	2
Geography 210	3
Spanish 320	3
Elective	3
	<hr/> 17

<i>Second Semester</i>	Credit
French 417	3
French 506*	3
Education 400	3
Spanish 321	3
Elective	3
	<hr/> 15

Senior Year

<i>First Semester</i>	Credit
French 508	3
Education 436	3
Education 637	3
Structural Linguistics	3
Elective	2
	<hr/> 14

<i>Second Semester</i>	Credit
Education 500	3
Education 527	3
Education 560	6
	<hr/> 12

Minimum Total Hours Required 124
 Minimum Total French Hours
 Required 36

**DIRECTORY OF FACULTY
 AND COURSES**

Foreign Languages

Lillie L. Andrews, B.A., North Carolina Central; M.A., Atlanta University; Ph.D., University of Wisconsin
 Brigitte E. Archibald, B.A., The King's College; M.A., Middlebury College at Mainz, Germany; Ph.D., University of Tennessee; Associate Professor of German
 Helen G. LeBlanc Disher, B.A., Talladega College; M.A., University of Illinois; Ph.D., University of Minnesota; Professor and Chairperson, Department of Foreign Languages
 Eugene B. Hastings, A.B., Colgate University, Hamilton, N.Y.; M.A., Middlebury College; Ph.D., University of Texas
 Carl E. Henderson, B.A., Morehouse College; M.A., Ph.D., Case Western Reserve University; Associate Professor of French

**COURSES IN FOREIGN
 LANGUAGES**

Courses in French

100 Elementary French I
 101 Elementary French II
 300 Intermediate French I
 301 Intermediate French II
 400 Phonetics
 402 French for Reading Comprehension
 410 Intermediate Oral French
 411 Advanced Oral French
 415 Survey of French Literature I
 416 Survey of French Literature II
 417 Literature of Afro-French Expression
 505 Advanced French Composition
 506 Advanced French Grammar and Composition
 508 French Civilization
 515 Structural Linguistics in the Teaching of French
 602 Problems and Trends in Foreign Languages

- 603 Oral Course for Teachers of Foreign Languages
- 606 Research in the Teaching of Foreign Languages
- 607 French Literature of the Seventeenth Century
- 608 French Literature in the Eighteenth Century
- 609 French Literature in the Nineteenth Century
- 610 The French Theatre
- 612 The French Novel
- 614 French Syntax
- 616 Contemporary French Literature
- 618 Selected Afro-French Poets
- 720 Advanced Reading and Composition
- 722 Romantic Movement in France
- 724 Seminar in Foreign Languages
- 726 Contemporary Literary Criticism
- 728 Independent Study in Foreign Languages

Courses in Spanish

- 104 Elementary Spanish I
- 105 Elementary Spanish II
- 320 Intermediate Spanish I
- 321 Intermediate Spanish II
- 401 Spanish for Reading Comprehension
- 440 Phonetics
- 441 Intermediate Conversation
- 422 Introduction to Spanish Literature
- 450 La Cultural Hispanica
- 451 Survey of Spanish Literature I
- 452 Survey of Spanish Literature II
- 455 Syntax

Courses in German

- 102 Elementary German I
- 103 Elementary German II
- 202 German Readings in the Natural, Social Science and Technical Fields
- 420 Conversational German
- 422 Intermediate German I
- 423 Intermediate German II
- 427 Survey of German Literature

Courses in Russian

- 106 Elementary Russian I
- 107 Elementary Russian II

Department of History

Peter V. Meyers,
Chairperson

OBJECTIVES

The Department of History offers students a knowledge of the past which enables them to better understand today's world and to prepare for the future. The Department also helps students develop skills in research, analysis, decision-making, and communication. These skills prepare students for successful careers, constructive participation in civic affairs, and lifelong learning. In short, the Department of History emphasizes the personal development of each student.

The specific objectives of the History Department are: 1) to contribute to the general education of students by providing the historical, geographical, and philosophical background for studying the arts, the sciences, and technical subjects; 2) to give historical content and professional skills to students preparing for careers in fields such as education, law, religion, international affairs, social service, journalism, history, or government; 3) to offer a curriculum which allows students to pursue the history of all areas of the world; 4) to offer a course of study leading to the Baccalaureate Degree in History, History Education, or Social Science Education; 5) to offer a course of study leading to the Master of Science Degree in Education with a concentration in either History or Social Science; and, 6) to provide instruction for students preparing for doctoral programs.

In carrying out its aims and objectives, the History Department offers a broad range of courses in history as well as courses in geography and

philosophy. To help ensure student success the Department assigns each student major to an advisor and it is particularly important that students consult their advisors when planning their educational programs. The Department also offers students a variety of extracurricular opportunities to enrich their college experiences. These activities include the History Club, the *History Magazine*, the Phi Alpha Theta International Honor Society in History, and numerous public lectures. Finally, the Department participates in the Honors Program of the College of Arts and Sciences which enables outstanding students to work closely with faculty members on special course and research assignments.

DEGREES OFFERED

- History—B.A.
- History, Secondary Education—B.S.
- Social Science, Secondary Education—B.S.
- * History, Secondary Education—M.S.
- * Social Science, Secondary Education—M.S.

* See the *Bulletin of the Graduate School*

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree programs in the History Department is based upon the general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

History Major—A student in the History Major must complete 124 semester hours of University courses. Included in the 124 hours are 30 hours in history courses at the 200 level or above and 18 hours in other social sciences. A minimum

grade of "C" must be achieved in these history and social science courses. The History Major also allows students to minor in another subject area and thus broaden their career preparation. The Department has developed specific minor concentrations for ministers, journalists, and those interested in Afro-American studies, mass media, or international economics.

Teaching Major in History—The Teaching Major in History requires 126 semester hours of University courses. Included in the 126 semester hours are 30 hours in history courses at the 200 level or above and 18 hours in the social sciences. This major also includes 25 hours of education courses and field experience as a student teacher. Students in this major must earn at least a "C" in all history, social science, general education, and professional education courses.

Teaching Major in Social Science—The Teaching Major in Social Science is an interdisciplinary program of study. Students pursuing this program must complete 124 semester hours of University courses. Included in the 124 hours are 21 hours in history courses at the 200 level or above and 24 hours in other social science courses. This major also includes 25 hours of education courses and field experience as a student teacher. Students in this major must earn at least a "C" in all history, social science, general education, and professional education courses.

The Minor in History—Students desiring to minor in history must complete 18 semester hours in history at the 200 level or above including History 204, 205, 303 and 304.

ACCREDITATION

All teacher education programs are accredited by the National Council for the Accreditation of Teacher Education and are approved by the State Department of Public Instruction.

CAREER OPPORTUNITIES

The undergraduate degree program in History, when combined with an appropriate minor, leads to careers in journalism, business, archives and museums, international affairs, and government service, among others. It also prepares students for law school, theological seminary, and other graduate and professional school programs.

The undergraduate and graduate education majors prepare students to teach history or the social sciences in secondary schools. Businesses also find that teacher education majors make good human relations specialists, personnel directors, technical writers, sales managers, directors of training programs, and administrators.

SUGGESTED PROGRAM FOR THE HISTORY MAJOR

Freshman Year

<i>First Semester</i>	Credit
Biol. Sci. 100 or Chem. 100	4
English 100	3
Math 101	3
History 100	3
Phy. Ed. or Health Ed.	1-2
English 102	2
	16-17

Second Semester Credit

Biol. Sci. 100 or Chem. 100	4
English 101	3
Math 102	3
History 101	3
Phy. Ed. or Health Ed.	1-2
Speech 250	3
	17-18

Sophomore Year

<i>First Semester</i>	Credit
History 250	3
Foreign Language	3
Humanities 200	3
History 204	3
Philosophy 261 or 262	3
Psychology 320	3
	18

<i>Second Semester</i>	Credit
Political Science 200 or 210	3
Foreign Language	3
Humanities 201	3
History 205	3
Social Science elective	3
	15

Junior Year

<i>First Semester</i>	Credit
History 303	3
History 310	3
Social Science elective	3
Economics 300 or 301	3
Geography, Sociology or Anthropology	3
	15

<i>Second Semester</i>	Credit
History 304	3
History 311	3
Elective or Minor	3
Elective or Minor	3
History elective	3
	15

Senior Year

<i>First Semester</i>	Credit
History elective	3
History elective	3
Elective or Minor	3
Elective or Minor	3
Economics 305	3
	15
<i>Second Semester</i>	Credit
Electives or Minor	14
	14

SUGGESTED PROGRAM FOR THE TEACHING MAJOR IN SOCIAL SCIENCES

Freshman Year

<i>First Semester</i>	Credit
Biol. Sci. 100 or Chem. 100	4
English 100	3
Math 101	3
History 100	3
Phy. Ed. 101	1
English 102	2
	16

<i>Second Semester</i>	Credit
Biol. Sci. 100 or Chem. 100	4
English 101	3
Math 102	3
History 101	3
Phy. Ed. 102	1
Speech 250	3
	17

Sophomore Year

<i>First Semester</i>	Credit
Psychology 320	3
Education 300	2
Foreign Language	3
Humanities 200	3
History 204	3
History 250	3
	<hr/>
	17

<i>Second Semester</i>	Credit
Political Science 200 or 210	3
Education 301	2
Foreign Language	3
Humanities 201	3
History 205	3
Philosophy 261 or 262	3
	<hr/>
	17

Junior Year

<i>First Semester</i>	Credit
History 303	3
Sociology 100 or	
Anthropology	3
Education 400	3
Economics 300	3
Geography 210	3
	<hr/>
	15

<i>Second Semester</i>	Credit
History 304	3
History elective	3
Education 436	3
Economics 301	3
Social Science elective	3
	<hr/>
	15

Senior Year

<i>First Semester</i>	Credit
History elective	3
Social Science elective	3
Social Science elective	3
Education 536	3
Free elective	1
Health Ed.	2
	<hr/>
	15

<i>Second Semester</i>	Credit
Education 500	3
Education 560	6
Education 624	3
	<hr/>
	12

SUGGESTED PROGRAM FOR THE TEACHING MAJOR IN HISTORY

Freshman Year

<i>First Semester</i>	Credit
Biol. Sci. 100 or Chem. 100	4
English 100	3
Math 101	3
History 100	3
Phy. Ed. 101	1
English 102	2
	<hr/>
	16

<i>Second Semester</i>	Credit
Biol. Sci. 100 or Chem. 100	4
English 101	3
Math 102	3
History 101	3
Phy. Ed. 102	1
Speech 250	3
	<hr/>
	17

Sophomore Year

<i>First Semester</i>	Credit
History 204	3
History 250	3
Psychology 320	3
Education 300	2
Foreign Language	3
Humanities 200	3
	<hr/>
	17

<i>Second Semester</i>	Credit
History 205	3
Political Science 200 or 210	3
Philosophy 261 or 262	3
Education 301	2
Foreign Language	3
Humanities 201	3
	<hr/>
	17

Junior Year

<i>First Semester</i>	Credit
History 303	3
History elective	3
Education 400	3
Economics 300	3
Geography 210	3
Health Ed.	2
	<hr/>
	17

<i>Second Semester</i>	Credit
History 304	3
Sociology 100 or	
Anthropology	3
Education 436	3
Economics 301	3
History elective	3
	<hr/>
	15

Senior Year

<i>First Semester</i>	Credit
History elective	3
History elective	3
History elective	3
Social Science elective	3
Education 536	3
	<hr/>
	15

<i>Second Semester</i>	Credit
Education 500	3
Education 560	6
Education 624	3
	<hr/>
	12

DIRECTORY OF FACULTY AND COURSES

- Frenise A. Logan, A.B., Fisk University; M.A., Ph.D., Case Western Reserve University; Professor
- Dorothy S. Mason, A.B., University of North Carolina at Greensboro; M.A., University of Georgia; Ph.D., University of North Carolina at Chapel Hill; Professor
- Wayman B. McLaughlin, A.B., Virginia Union University; B.D., Andover Newton Theological School; Ph.D., Boston University; Professor
- James G. Nutsch, B.S., Kansas State University; M.A., Ph.D., University of Kansas; Professor
- Peter V. Meyers, B.A., Wesleyan University; M.A., Ph.D., Rutgers University; Professor & Chairperson
- *Donna J. Benson, B.A., University of North Carolina at Greensboro; M.A., Ph.D., Duke University; Assistant Professor

David F. Porter, B.A., Glassboro State College; M.A., Ph.D., Cornell University; Assistant Professor
 Ahmad Sikainga, B.A., M.A., University of Khartoum; Ph.D., University of California at Santa Barbara; Assistant Professor
 Ralph M. Ross, A.B., Knoxville College; B.D., M.Div., Interdenominational Theological Center; Assistant Professor
 Olen Cole, Jr., B.A., M.A., California State University at Fresno; Ph.D., University of North Carolina at Chapel Hill; Assistant Professor
 Sandra T. Williamson, B.A., Johnson C. Smith University; M.A., University of Illinois; Instructor

*On Leave 1988-89

Courses

- 100 History of World Civilizations—Part I
- 101 History of World Civilizations—Part II
- 204 United States from 1492-1877
- 205 United States Since 1877
- 208 History of North Carolina
- 209 The American Military Experience
- 215 History of Africa to 1800
- 216 History of Africa Since 1800
- 220 History of Science and Technology
- 250 The Nature, Study and Writing of History
- 300 Ancient History
- 302 The Pre-Modern West
- 303 Early Modern Europe: Renaissance to 1815
- 304 Modern Europe Since 1815
- 305 Socialism Since Karl Marx
- 306 History of Women Since 1800
- 307 The Historical Origins of Environmental Crises
- 310 The Afro-American in the United States to 1877
- 311 The Afro-American in the United States Since 1877
- 312 History of Religions
- 327 History of Latin America
- 328 Slavery in the United States, 1619-1865
- 330 History of the Far East to 1800
- 331 History of the Far East Since 1800
- 332 The Modern Middle East
- 334 Honors in History

- 401 Old Testament History and Literature
- 402 The Rise of Christianity
- 405 History of England
- 407 American Diplomatic History
- 410 American Constitutional History
- 412 Modernization in Africa from 1920 to the Present
- 416 History of Black Culture in the United States
- 420 Seminar: Urban America
- 430 Topics in Twentieth Century American History
- 442 Russian and Soviet History
- 450 Modernization in Historical Perspective
- 600 The British Colonies and the American Revolution
- 603 The Civil War and Reconstruction
- 605 Seminar on the Soviet Union
- 606 United States History, 1900-1932
- 607 United States History, 1932-Present
- 615 Seminar in the History of Black American
- 616 Seminar in African History
- 617 Readings in African History
- 620 Seminar in Asian History
- 625 Seminar in Historiography and Historical Method
- 626 Revolutions in the Modern World
- 630 Studies in European History, 1815-1914
- 631 Studies in Twentieth Century Europe, 1914 to the Present
- 633 Independent Study in History

Philosophy

- 260 Introduction to Philosophy
- 261 History of Philosophy
- 262 Logic
- 268 Culture and Value
- 269 Contemporary Philosophy

Geography

- 200 Principles of Geography
- 210 World Regional Geography
- 319 Regional Geography of the United States and Canada
- 322 Economic Geography
- 640 Topics in Geography of the United States and Canada
- 641 Topics in World Geography

Department of Mathematics and Computer Science

Wendell P. Jones, Chairperson

OBJECTIVES

The objectives of the Department of Mathematics and Computer Science are consistent with the purpose and philosophy of the University. The Department provides training in mathematical and computer sciences that will help students served by it to deal with quantitative matters intelligently and effectively. In addition, the Department offers programs of study from which graduates can emerge with high degrees of mathematical skill and with sufficient training in related areas that they will be able to cope in diverse mathematical and computer environments.

DEGREES OFFERED

Computer and Information Sciences—B.S.
 Engineering Mathematics—B.S.
 Mathematics—B.S.
 Mathematics, Secondary Education—B.S.
 *Applied Mathematics—M.S.
 *Mathematics, Secondary Education—M.S.

GENERAL PROGRAM REQUIREMENTS

Admission, retention and graduation requirements for students enrolled in degree programs in the Department of Mathematics and Computer Science are based upon the general admission, retention and

graduation requirements of the University. However, two units of algebra, one unit of plane geometry and one-half unit of trigonometry are required of all students who elect to pursue any curriculum offered in the department.

SPECIFIC PROGRAM REQUIREMENTS

Computer and Information Sciences

The Computer and Information Sciences major must complete a minimum of 124 semester hours of University courses, including 39 hours in computer science courses and 20 hours in mathematics.

Engineering Mathematics

The Engineering Mathematics major must complete a minimum of 139 semester hours of University courses, including 45 hours in mathematics and 39 hours in science and engineering courses.

* See the Bulletin of the Graduate School.

Mathematics

The Mathematics major must complete a minimum of 124 semester hours of University courses. These include 49 hours in mathematics or computer science courses.

Mathematics, Secondary Education

The Mathematics Education major must complete a minimum of 124 semester hours of University courses. These include 44 hours in mathematics, 3 of which must be in a course numbered higher than Mathematics 507, and 29 hours in education and/or psychology. All Teacher Education admission, retention and graduation standards apply.

CAREER OPPORTUNITIES

The Bureau of Labor Statistics of the U.S. Department of Labor in its

"Occupational Outlook for College Graduates" continues to report that the employment outlook for computer-oriented graduates is very good. Opportunities in the area are expected to grow faster than the average of all occupations through the 1990's. Also, opportunities in education, cost analysis, government service and public health are expected to be good for graduates in mathematics.

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN COMPUTER AND INFORMATION SCIENCES

Freshman Year

<i>First Semester</i>	Credit
Math. 123	3
* Natural Science Group	4
Education 100	1
English 100	3
Computer Science 160	3
	14

<i>Second Semester</i>	Credit
Math. 131	4
* Natural Science Group	4
Computer Sc. 260	3
English 101	3
History 100	3
	17

* One of the following groups should be taken:

Chem. 101, 111 (Lab.); 102, 112 (Lab.) 4 + 4

Chem. 106, 116 (Lab.); 107, 117 (Lab.) 4 + 4

Biology 100, Botany 140

Physics 211, 216 (Lab.); 212, 217 (Lab.) (Prerequisite Math 111 or equivalent) 4 + 4

Physics 225, 235 (Lab.); 226, 236 (Lab.) (Prerequisite Math 111 or equivalent) 4 + 4

Chem. 100 (Phy. Sc.), 110 (Lab.); Biology 100 or Botany 140 4 + 4

Botany 140, Zoology 160 4 + 4

Sophomore Year

<i>First Semester</i>	Credit
Math. 132	4
Speech 250	3
French 100 or German 102	3
Computer Sci. 355	3
History 101	3
	16

<i>Second Semester</i>	Credit
Math. 223	3
Health Ed. 200	2
French 101 or German 103	3
Computer Sci. 380	3
Math. 240/Elective	3
Elective	2
	16

Junior Year

<i>First Semester</i>	Credit
Math. 224	3
Humanities 200	3
Computer Sci. 385	3
Computer Sci. 465	3
Economics 300	3
	15

<i>Second Semester</i>	Credit
Math. 350	3
Humanities 201	3
Computer Sci. 470	3
Economics 301	3
Computer Sci. Elective	3
	15

Senior Year

<i>First Semester</i>	Credit
Computer Sci. 475	3
Computer Sci. Elective	3
Electives	10
	16

<i>Second Semester</i>	Credit
Computer Sci. 585	3
Computer Sci. Electives	6
**Electives	6
	15

**One 3 hour elective must be chosen from Humanities.

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN ENGINEERING MATHEMATICS

Freshman Year

<i>First Semester</i>	Credit
Math. 131	4
Chem. 101, 111 (Lab.); 106 116 (Lab.)	4
English 100	3
Mechanical Engr. 101	3
Electives or Air/Military Sc.	2
	16

<i>Second Semester</i>	Credit
Math. 132	4
Chem. 102, 112 (Lab.); 107 117 (Lab.)	4
English 101	3
Mechanical Engr. 102	3
Electives or Air/Military Sc.	2
	<u>16</u>

Sophomore Year

<i>First Semester</i>	Credit
Math. 231	4
Math 240	3
Physics 241, 251 Lab.	5
History 100	3
Humanities 200	3
	<u>18</u>

<i>Second Semester</i>	Credit
Math. 331	3
Math 224	3
Physics 242, 252 Lab.	5
History 101	3
Humanities 201	3
	<u>17</u>

Junior Year

<i>First Semester</i>	Credit
Math. 332	3
Math 350	3
Mechanical Engr. 441	3
Economics 300	3
Health Ed. 200	2
Electives	4
	<u>18</u>

<i>Second Semester</i>	Credit
Math. 440 or 460	3
Math 520	3
Mechanical Engr. 442	3
Physics 406	3
Economics 301	3
Speech 250	3
	<u>18</u>

Senior Year

<i>First Semester</i>	Credit
Math. 507	3
Math. 511	3
Physics 400	3
Foreign Language (French or German)	3
Electives	4
	<u>16</u>

<i>Second Semester</i>	Credit
Math. 508	3
Math. 512	3
Physics 600	3
Foreign Language (French or German)	3
Electives	6
	<u>18</u>

** Offered in cooperation with the
School of Engineering*

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN MATHEMATICS

Freshman Year

<i>First Semester</i>	Credit
Math. 131	4
Chem. 101	3
Chem. Lab. 111	1
English 100	3
History 100	3
Education 100	1
	<u>15</u>

<i>Second Semester</i>	Credit
Math. 132	4
Chem. 102	3
Chem. Lab. 112	1
English 101	3
History 101	3
	<u>14</u>

Sophomore Year

<i>First Semester</i>	Credit
Math. 231	4
Math. 240 or Computer Sci. 260	3
Physics 241	3
Physics Lab. 251	2
Speech 250	3
Humanities 200	3
	<u>18</u>

<i>Second Semester</i>	Credit
Math. 350	3
Math. 242	3
Physics 242	3
Physics Lab. 252	2
Humanities 201	3
Health Ed. 200	2
	<u>16</u>

Junior Year

<i>First Semester</i>	Credit
Math. 507	3
* Math Elective (300 level/above)	3
Math. 224	3
French 100, German 102 or Russian 106	3
Electives	3
	<u>15</u>

<i>Second Semester</i>	Credit
* Math Elective (300 level/above)	6
Physics 406	3
French 101, German 103 or Russian 107	3
Electives	4
	<u>16</u>

Senior Year

<i>First Semester</i>	Credit
Math. 505	1
Math. 511	3
* Math Elective (500 level/above)	3
Electives	8
	<u>15</u>

<i>Second Semester</i>	Credit
* Math. Elective (500 level/above)	3
* Math. Elective (400 level/above)	3
Electives	9
	<u>15</u>

** Computer Science 460, 665, and 675 may
be taken as mathematics electives.*

SUGGESTED CURRICULUM GUIDE FOR A TEACHING MAJOR IN MATHEMATICS

Freshman Year

<i>First Semester</i>	Credit
Math. 110	4
* Science	4
English 100	3
Physical Ed. 100	1
C & I 100	1
History 100	3
	<u>16</u>

<i>Second Semester</i>	Credit
Math. 131	4
* Science	4
English 101	3
Physical Ed.	1
History 101	3
	<hr/> 15

Sophomore Year

<i>First Semester</i>	Credit
Math. 132	4
Physics 225	3
Physics Lab. 235	1
C & I 300	2
Humanities 200	3
Health Ed. 200	2
Math. 350	3
	<hr/> 18

<i>Second Semester</i>	Credit
Math. 231	4
Physics 226	3
Physics Lab. 236	1
C & I 301	2
Psychology 320	3
Humanities 201	3
	<hr/> 16

Junior Year

<i>First Semester</i>	Credit
Math. 224	3
French 100 or German 102	3
Education 400	3
Speech 250	3
Math. 507	3
Math. 511	3
	<hr/> 18

<i>Second Semester</i>	Credit
Math 242	3
French 101 or German 103	3
C & I 436	3
Math. 240	3
Math. 508 or 512	3
Electives	3
	<hr/> 18

Senior Year

<i>First Semester</i>	Credit
C & I 624	3
Electives (Math.)	6
Math. 505	1
Electives	2
	<hr/> 12

<i>Second Semester</i>	Credit
C & I 500	3
C & I 529	3
C & I 560	6
	<hr/> 12

** The Science requirement may be any one of the following sequences: Chem. 101, 111 and 102, 112, Botany 140, Zoology 160; or, Zoology 160, Botany 140, Biological Science 100, Physical Sc. 100*

DIRECTORY OF FACULTY AND COURSES

Mathematics and Computer Science

Bolindra N. Borah, B.S., Gauhat University, India; M.S., Ph.D., Oregon State University; Professor

Wendell P. Jones, B.S., North Carolina A&T State University; M.S., Ph.D., University of Iowa; Professor and Chairperson

Wilbur L. Smith, B.S., North Carolina A&T State University; M.S., Ph.D., The Pennsylvania State University; Professor

Richard R. Tucker, B.S., University of Washington; M.S., Ph.D., Oregon State University; Professor

Gilbert Casterlow, Jr., B.S., M.S., North Carolina A&T State University; Ph.D., The Pennsylvania State University; Associate Professor

James F. Chew, B.S., M.S., Ph.D., Virginia Polytechnic Institute; Associate Professor

J. Octavio Diaz, B.S., Ph.D., University of Havana; Associate Professor

Joseph R. Gruendler, B.S., M.S., Ph.D., University of Wisconsin; Ph.D., University of North Carolina at Chapel Hill; Associate Professor

Nan P. Manuel, B.S., Morgan State University; M.S., Howard University; Ph.D., The Union Graduate School for Experimenting Colleges and Universities; Associate Professor

Gwendolyn H. Cherry, B.S. M.S., North Carolina A&T State University; Assistant Professor

Thomas G. Clarke, B.A., Hiram College; M.S., Purdue University; Ph.D., Kent State University; Assistant Professor

Willie C. High, B.S., North Carolina Central University; M.S., North Carolina A&T State University; M.A., University of North Carolina at Greensboro; Assistant Professor

Cardoza McCollum, B.S., M.S., North Carolina A&T State University; Assistant Professor

Robert C. Mers, A.B., University of Texas; M.S., University of Illinois; Ph.D., University of Colorado; Assistant Professor

Margaret W. Artis, B.S., North Carolina Central University; M.E., The Pennsylvania State University; Instructor

Shearon A. Brown, B.S., M.S., North Carolina A&T State University; M.S., University of Illinois; Instructor

Marcus Lamberth, B.S., M.S., North Carolina A&T State University; M.S., University of Illinois; Instructor

Amos O. Olagunju, B.Sc., Ahmadu Bello University; M.Sc., Queen's University (Kingston, Canada); Instructor

Gloria J. Phoenix, B.S., Virginia Union University; M.S., University of North Carolina at Chapel Hill; Lecturer

Patricia G. Shelton, B.S., M.S., North Carolina A&T State University; Lecturer

Courses—Computer Science

160 Introduction to Computer Science

260 Computer Language: Pascal

280 Conversational PL/1 Programming

355 Algorithmic Analysis and Advanced PASCAL

380 Data Structures

385 Systems Analysis and Design Using COBOL

460 Numerical Analysis

- 465 Programming Principles
- 470 Assembly Language Programming
- 475 Switching Theory and Computer Organization
- 490 Software Engineering Using Ada
- 560 Systems Programming
- 570 Data Base Design
- 585 Theoretical Aspects of Computing
- 631 Linear and Non-Linear Programming
- 660 Computer Science for Secondary School Teachers
- 665 Principles of Optimization
- 670 Simulation Concepts and Languages
- 675 Graph Theory
- 680 Systems Analysis Techniques
- 690 Advanced Topics in Computer Science

Courses—Mathematics

- 100 Intermediate Mathematics
- 101 Fundamentals of Algebra and Trigonometry—Part I
- 102 Fundamentals of Algebra and Trigonometry—Part II
- 110 Pre-Calculus for Engineers and Scientists
- 111 College Algebra and Trigonometry
- 112 Calculus for Non-Mathematics Majors
- 123 Discrete Mathematics I
- 131 Calculus—Part I
- 132 Calculus II
- 115 Mathematics of Business and Finance
- 223 Discrete Mathematics II
- 224 Introduction to Probability and Statistics
- 231 Calculus III
- 240 Introduction to the Programming of Digital Computers
- 242 College Geometry
- 331 Introduction to Applied Mathematics—Part I
- 332 Introduction to Applied Mathematics—Part II
- 350 Linear Algebra and Matrix Theory—Part I
- 420 History of Mathematics
- 423 Theory of Equations
- 440 Numerical Methods
- 505 Seminar in Mathematics
- 507 Intermediate Analysis—Part I
- 508 Intermediate Analysis—Part II

- 511 Abstract Algebra—Part I
- 512 Abstract Algebra—Part II
- 520 Linear Algebra and Matrix Theory II
- 550 Vector Analysis
- 600 Introduction to Modern Mathematics for Secondary School Teachers
- 601 Algebraic Equations for Secondary School Teachers
- 602 Modern Algebra for Secondary School Teachers
- 603 Modern Analysis for Secondary School Teachers
- 604 Modern Geometry for Secondary School Teachers
- 606 Mathematics for Chemists
- 607 Theory of Numbers
- 608 Mathematics of Life Insurance
- 620 Elements of Set Theory and Topology
- 623 Advanced Probability and Statistics
- 624 Methods of Applied Statistics
- 625 Mathematics for Elementary Teachers, K-8—Part I
- 626 Mathematics for Elementary Teachers, K-8—Part II
- 631 Linear and Non-Linear Programming
- 632 Games and Queue Theory
- 651 Methods in Applied Mathematics—Part I
- 652 Methods in Applied Mathematics—Part II

Department of Music

Clifford E. Watkins
Chairperson

OBJECTIVES

The general objective of the department of music are: (1) to enhance the cultural and aesthetic life of the university student through personal experiences in a well directed program of education in music; (2) to provide the student with basic skills, techniques, pedagogical concepts, and perspective for a career as an artist and as a teacher of music on the elementary

and secondary school levels; and (3) to interpret, create, and maintain the highest level in individual and group performance in music.

DEGREES OFFERED

- B.S.—Music Education (Instrumental Concentration)
- B.S.—Music Education (Choral Concentration)
- B.A.—Music (Applied Music Concentration)
- B.A.—Music (Music History and Literature Concentration)

The Department of Music offers two degree programs. One of these is a liberal arts curriculum leading to the Bachelor of Arts in Music degree with concentrations in Applied music or Music History and Literature. This degree program is designed to accommodate students who wish to enter some area of music other than teaching. The other degree program is a teacher-education based curriculum leading to the Bachelor of Science in Music Education degree with either a choral or instrumental concentration. Students intending to teach in the public schools are strongly urged to follow this curriculum in order that they may meet certification requirements.

CAREER OPPORTUNITIES

Successful completion of the requirements of the B.A. degree in Music or the B.S. degree in Music Education provides the students with possible career opportunities for public school music teaching, as well as for a career in the performing arts.

ACADEMIC COUNSELING

Each student is assigned to a music faculty member for counseling in matters of curriculum and related or personal problems as are appropriate. Students should consult regularly with the advisors to gain the benefits from their experience and expertise.

ADMISSION—RETENTION— EVALUATION

The admission of students to the undergraduate degree programs in the Department of Music is based upon the general admission requirements of the University.

For certified admission to the study of music as a major, the prospective music student must stand in a satisfactory manner:

1. Auditions set by the faculty panel in his/her principal applied music area.
2. Standardized tests consisting of the *Watkins-Farnum Performance Scale*, the *Seashore Tests of Musicality*, the *Kwalwasser-Ruch Test of Musical Accomplishment* and the entrance level *Aliferis Test of Musical Achievement*.

"To continue in the department of music as a major, students must maintain a "C", (2.0) average in all music courses. Students whose average fall below 2.0 will be placed on departmental probation for the following semester of enrollment. Should the average not meet the minimum requirements at the end of the probationary period, their status will be subject to review by the departmental Committee on Curriculum, Standards and Measures. Students who earn a semester grade of "D" or below, must repeat the affected course(s) and earn a grade of "C" or better before enrolling into any continuation or the next level of said course(s)."

Seniors are encouraged to take the *Undergraduate Record*, the *Graduate Record* and the *National Teacher Examinations* to build a data base for evaluation of the music program.

Upon entrance into the music education program, each student must choose either an instrumental or a choral concentration. Those whose principal applied music subject is either voice or piano should select the choral concentration; and those whose

principal applied subject is an orchestral instrument should select the instrumental concentration. A student is not fully admitted to the teacher-education program, however, until the end of the sophomore year. At this time his/her academic work and general prospects as a teacher are examined by his/her department and the Teacher-Education Council. This is accomplished in part through special inventories and tests of achievement. Upon acceptance, the student is permitted to enroll in upper level professional education courses. Admission to the teacher-education program of the university is regulated by the School of Education.

At the end of the four years, the student is again evaluated by his/her department and the Teacher Education Council to determine whether he/she has developed the competencies required of a teacher in his/her discipline. If the student is able to satisfy all exit criteria, he is then recommended for a teaching certificate. More detailed information concerning entrance and exit requirements and procedures for the teacher-education program is available from the academic advisor.

PERFORMANCE ENSEMBLES

Each student with a major in music is required to maintain continuous membership in a departmentally sanctioned performance Ensemble. Participation in more than a single ensemble is possible and encouraged so long as there are no schedule conflicts or violations of University policy concerning student course load.

Attendance is required for all music majors and minors at student or faculty recitals, band, choir, and chamber ensemble concerts, and lyceum programs that involve musical performance. A systematic method of checking and recording attendance will be used. "All ensembles must have four or more members."

INSTRUMENTS AND PRACTICE FACILITIES

Several studios are provided as practice facilities for students. Each contains a piano which is tuned regularly and kept in good repair.

With the exception of piano students, each music major/minor is required to furnish an instrument for his personal use. University-owned instruments are primarily for the use of non-major students who serve in the instrumental ensembles to complete the necessary instrumentation as need dictates. In as great a quantity as is possible, University-owned instruments will be provided for the instruction of music majors and minors in music education classes.

DEPARTMENTAL REQUIREMENTS FOR THE MAJOR

Bachelor of Science in Music Education

Instrumental Concentration

- I. Applied Music—21 Semester Hours
113, 213, 413, 114, 214, 503, 513, 550
 - II. Music Theory—21 Semester Hours
101, 102, 200, 201, 400, 402, 501
 - III. Music History and Literature—6 Semester Hours
403, 404
 - IV. Music Education—7 Semester Hours
424, 425, 426, 427
 - V. Music Performance—14 Semester Hours
One ensemble required each semester, elect from 300, 301, or 309, and add 307 each semester.
 - VI. Professional Education—27 Semester Hours
Education 300, 301, 400, 436, 500, 530, 532, 560, 624
- TOTAL HOURS REQUIRED: 96 Semester Hours

Choral Concentration

- I. Applied Music—23 Semester Hours
100 or 560, 113, 213, 413, 503, 513, 550, 114, 214
 - II. Music Theory—21 Semester Hours
101, 102, 200, 201, 400, 402, 501
 - III. Music History and Literature—6 Semester Hours
403, 404
 - IV. Music Education—6 Semester Hours
424, 425, 426,
 - V. Music Performance—14 Semester Hours
One ensemble required each semester, elect from 300, 301, or 309, and add 307 each semester.
 - VI. Professional Education—27 Semester Hours
Education 300, 301, 400, 436, 500, 530, 531, 560, 624
- TOTAL HOURS REQUIRED: 96 Semester Hours**

BACHELOR OF ARTS IN MUSIC

Applied Music Concentration

- I. Applied Music—24 Semester Hours
113, 213, 413, 513, 114, 214, 503, 550. Voice students add 100. Piano students add 560.
- II. Music Theory—21 Semester Hours
101, 102, 200, 201, 400, 402, 501
- III. Music History and Literature—10 Semester Hours
403, 404, Wind and Percussion students add 408 and 412. Piano students add 409 and 411. Voice students add 410 and 411.
- IV. Music Performance—18 Semester Hours
307 and either 300 or 301 or 309 (eight semesters); and either 302, 303, 304, 305, 306, or 308 (two semesters) in senior year.
- V. Other Music Courses—3 Semester Hours
618

- VI. Related Courses—3 Semester Hours
Philosophy 260

TOTAL HOURS REQUIRED: 79

HISTORY AND LITERATURE CONCENTRATION

- I. Applied Music—25 Semester Hours
113, 213, 413, 513, 114, 214, 503, 550. Voice students add 100. Piano students add 560.
- II. Music Theory—21 Semester Hours
101, 102, 200, 201, 400, 402, 501
- III. Music History and Literature—18 Semester Hours
403, 404, 405, 406, 407, 408, 410, and either 409, 411, 412
- IV. Music Performance—18 Semester Hours
One ensemble required each semester, elect from 300, 301, or 309 and add 307 each semester.
- V. Other Music Courses—3 Semester Hours
618
- VI. Related Courses—6 Semester Hours
English 210, 500

TOTAL HOURS REQUIRED: 90 Semester Hours

MUSIC MINOR CURRICULUM

- I. Applied Music 6 Cr. Hrs.
2 Sem. Mus. 113 Principal Applied Instrument/Voice 4 Hrs.
1 Sem. Mus. 213 Principal Applied Instrument/Voice 2 Hrs.
(Interested Students may elect to additional hours)
- II. History of Music 3 Cr. Hrs.
1 Sem. Music 218 Introduction to Music Literature 3 Hrs.
(Interested Students may elect three additional hours)
- III. Music Theory 6 Cr. Hrs.
1 Sem. Mus. 101 Theory I 3 Hrs.

- 1 Sem. Mus. 102 Theory II 3 Hrs.

- IV. Performance Ensemble (Minimum) 4 Cr. Hrs.
Music minors must participate in an Ensemble for four semesters.

- V. Music Electives 3 Cr. Hrs.
TOTAL: 22 Hours

GENERAL EDUCATION REQUIREMENTS FOR B.S. IN MUSIC EDUCATION

English Composition (2 courses required)

- Eng 100 3(3-0)
- Eng 101 3(3-0)

Natural and Physical Science (4 courses required)

- Biol 100 4(3-2)
- Phys 201 3(2-2)
- Math 101 3(3-0)
- Math 102 3(3-0)

Foreign Language (2 courses required)

- French, German, or Spanish I 3(3-0)
- French, German, or Spanish II 3(3-0)

Social and Behavioral Sciences (3 courses required)

- Hist 100 3(3-0)
- Hist 101 3(3-0)
- Psy 320 3(3-0)

Humanities (4 courses required*)

- Eng 200 or Mus 216 3(3-0)
- Eng 201 or Mus 218 3(3-0)
- Speech 250 3(3-0)
- *Mus 403 and 404 complete the Humanities requirement

Health or Physical Education

- Phy Ed 200 2(2-0)
- Phy Ed 101 1(0-2)
- Phy Ed 102 1(0-2)

GENERAL EDUCATION REQUIREMENTS FOR B.A. IN MUSIC

Applied Music Concentration

NOTE: The general education requirements are the same as for the B.S. in Music Education requirements with the following exceptions:

- 1) Add: Phil 260 3(3-0)
 2) Delete: Phy Ed 101 1(0-2)
 Phy Ed 102 1(0-2)
 Speech 250 2(2-0)

MUSIC HISTORY AND LITERATURE CONCENTRATE

NOTE: The general education requirements are the same as for the B.S. in Music Education requirements with the following exceptions:

- 1) Add: Phil 260 3(3-0)
 Eng 210 3(3-0)
 Eng 500 3(3-0)
 2) Delete: Phy Ed 101 1(0-2)
 Phy Ed 102 1(0-2)
 Speech 250 2(2-0)

BACHELOR OF SCIENCE DEGREE IN MUSIC EDUCATION

Instrumental Concentration

Freshman Year

<i>First Semester</i>	Credit
Music 101	3
Music 113	2
Music 114	1
Music 300, 301, or 309	2
Music 307	0
English 100	3
History 100	3
Physics 200	2
	<hr/> 16

<i>Second Semester</i>	Credit
Music 102	3
Music 113	2
Music 114	1
Music 300, 301, or 309	2
Music 307	0
English 101	3
History 101	3
Biology 100	4
	<hr/> 18

Sophomore Year

<i>First Semester</i>	Credit
Music 200	3
Music 213	2
Music 214	1
Music 300, 301, or 309	2
Music 307	0
Foreign Language I— French, German, or Spanish	3
Math 101	3
Psychology 320	3
Physical Ed 101	1
	<hr/> 18

<i>Second Semester</i>	Credit
Music 201	3
Music 213	2
Music 214	1
Music 300, 301, or 309	2
Music 307	0
Foreign Language II— French, German, or Spanish	3
Math 102	3
Education 300	2
Physical Ed 102	1
Speech 250	3
	<hr/> 20

Junior Year

<i>First Semester</i>	Credit
Music 400	3
Music 403	3
Music 413	2
Music 300, 301, or 309	2
Music 307	0
Music 424	2
Music 425	2
English 200 or Music 216	3
Education 301	2
	<hr/> 19
<i>Second Semester</i>	Credit
Music 402	3
Music 404	3
Music 413	2
Music 300, 301, or 309	2
Music 426	2
Music 427	1
Music 307	0
English 201 or Music 218	3
Physical Ed 200	2
	<hr/> 18

Senior Year

<i>First Semester</i>	Credit
Music 300, 301, or 309	2
Music 307	0
Music 501	3
Music 503	2
Music 550	1
Education 436	3
Education 530	2
Education 400	3
Music 513	2
	<hr/> 18

<i>Second Semester</i>	Credit
Education 500	3
Education 532	3
Education 560	6
Education 637	3
	<hr/> 15

Total Hours: 142 hrs.
 General Education: 46 hrs.
 Music Hours: 69 hrs.
 Professional Education: 27 hrs.

NOTE: The particular requirements for the B.S. degree in Music Education with a Choral Concentration are the same as the instrumental concentration with the following exceptions:

Freshman Year; First Semester:
 Voice students add Mus 100 *Diction for Singers* (1 Hr.); Piano students take Mus 560 *Accompanying* (2 Hr.)

Junior Year, Second Semester:
 Delete Mus 427 *Voice Class* (1 Hr.)

Senior Year, Second Semester: Substitute Ed 531 *Vocal Methods and Materials* (3 Hrs.) instead of Ed 532

Total Hours: 142 hrs.
 General Education: 46 hrs.
 Music Hours: 69 hrs.
 Professional Education: 27 hrs.

BACHELOR OF ARTS DEGREE IN MUSIC

Freshman Year

<i>First Semester</i>	Credit
Music 101	3
Music 113	2
Music 114	1
Music 300, 301, or 309	2
Music 307	0
English 100	3
History 100	3
Music 100	1
	<hr/> 15

Second Semester

	Credit
Music 102	3
Music 113	2
Music 114	1
* Music 300, 301, or 309	2
Music 307	0
English 101	3
History 101	3
	<hr/> 14

Sophomore Year

<i>First Semester</i>	Credit
Music 200	3
Music 213	2
Music 214	1
* Music 300, 301, or 309	2
Music 307	0
Foreign Language I— French, German, or Spanish	3
Math 101	3
Physical Ed. 200	2
	<hr/> 16

Second Semester

	Credit
Music 201	3
Music 213	2
Music 214	1
* Music 300, 301, or 309	2
Music 307	0
Foreign Language II— French, German, or Spanish	3
Math 102	3
Physics 200	2
	<hr/> 16

Junior Year

<i>First Semester</i>	Credit
Music 400	3
Music 413	2
* Music 300, 301, or 309	2
Music 307	0
Music 403	3
English 200	3
Philosophy 260	3
	<hr/> 16

Second Semester

	Credit
Music 402	3
Music 413	2
* Music 300, 301, or 309	2
Music 404	3
Music 307	0
English 201	3
Biology 100	4
	<hr/> 17

Senior Year

<i>First Semester</i>	Credit
* Music 300, 301, or 309	2
Music 302, 303, 304, 305, or 308	1
Music 307	0
Music 408 Symphony or Music 410 Opera	2
Music 501	3
Music 513	2
Psychology 320	3
Music 560 (Piano only)	2
	<hr/> 15

Second Semester

	Credit
* Music 300, 301, or 309	2
Music 302, 303, 304, 305, or 308	1
Music 307	0
Music 411 or Music 412 or Music 409	2
Music 513	2
Music 503	2
Music 550	1
Music 618	3
	<hr/> 13

*NOTE: Only Voice Majors take
Mus 100 *Diction for Singers*. The B.A. Applied

Music Curriculum requires
8 semesters of a 2-hour
ensemble, either Music 300,
301, or 309; in addition, the
Applied Concentration
requires two 1-hr. ensem-
bles or Music 560 for Piano
students.

Total Hours: 123 hrs.

General Education: 44 hrs.

Music Hours: 79 hrs.

BACHELOR OF ARTS DEGREE IN MUSIC

Music History and Literature Concentration

Freshman Year

<i>First Semester</i>	Credit
Music 101	3
Music 113	2
Music 114	1
Music 307	0
Music 300, 301, or 309	2
Music 100 (Voice only)	1
English 100	3
History 100	3
	<hr/> 15

Second Semester

	Credit
Music 102	3
Music 113	2
Music 114	1
Music 307	0
Music 300, 301, or 309	2
English 101	3
History 101	3
Biology 100	4
	<hr/> 18

Sophomore Year

<i>First Semester</i>	Credit
Music 200	3
Music 213	2
Music 214	1
Music 300, 301, or 309	2
Music 307	0
Music 403	3
Math 101	3
Music 560 (Piano only)	2
	<hr/> 16

<i>Second Semester</i>	Credit
Music 201	3
Music 213	2
Music 214	1
Music 300, 301, or 309	2
Music 307	0
Music 404	3
Math 102	3
Physical Ed 200	2
	<hr/> 16

Junior Year

<i>First Semester</i>	Credit
Music 400	3
Music 405	2
Music 413	2
Music 300, 301, or 309	2
Music 307	0
Foreign Language I— French, German, or Spanish	3
English 200	3
Psychology 320	3
	<hr/> 18

<i>Second Semester</i>	Credit
Music 402	3
Music 406	2
Music 413	2
Music 300, 301, or 309	2
Music 307	0
Foreign Language I— French, German, or Spanish	3
English 201	3
Philosophy 260	3
	<hr/> 18

Senior Year

<i>First Semester</i>	Credit
Music 300, 301, or 309	2
Music 407	2
Music 408	2
Music 501	3
Music 513	2
Music 618	3
English 210	3
	<hr/> 17

<i>Second Semester</i>	Credit
Music 300, 301, or 309	2
Music 410	2
Music 409 or	
Music 411 or	
Music 412	2
Music 503	2
Music 550	1
English 500	3
	<hr/> 12

Total Hours: 131 hrs.
Music Hours: 81 hrs.
General Education: 50 hrs.

DIRECTORY OF FACULTY AND COURSES

Music

Clifford E. Watkins, B.A., Clark College; M.Mus.Ed., Ph.D., Southern Illinois University; Professor and Chairperson
Walter F. Carlson, Jr., B.S., A&T College; M. Mus., University of Michigan; Associate Professor
Johnny B. Hodge, B.A., North Carolina Central University; M.M., University of North Carolina at Greensboro; Ph.D., American University; Associate Professor
Judith W. Howle, B.M., Performer's Diploma; MM Eastman School of Music, University of Rochester, University of N.C. at Greensboro; Assistant Professor
Armenta A. Hummings, B.S., M.S., The Julliard School; Visiting Instructor
Sonja Z. McLean, Bachelor of Music, North Carolina School of the Arts; Master of Music, Manhattan School of Music
Marie M. Pittman, B.S., North Carolina Central University; M.S., Atlanta University
Curtis E. Powell, B.A., Talladega College; M.A., Alabama State University; further study, Eastman School of Music

William C. Smiley; B.M.E., Jackson State College; M.S., University of Illinois; Ed.D., University of North Carolina at Greensboro; Associate Professor
Jimmie J. Williams, B.S., Florida A. & M. University; M.S., University of Illinois; Associate Professor
Paula H. Harrison, B.A., N.C. Central University; M.M., Ohio State University; Instructor of Music

Courses in Music Theory

301, 302 Theory I, II
119 Sight Singing and Ear Training
200, 201 Theory III, IV
400 Counterpoint
402 Form and Analysis
414 Composition
415 Electronic Music
501 Arranging

Courses in Music History and Literature

216 Music Appreciation I
217 Music Appreciation II
218 Introduction to Music Literature
220 History of Black Music in America
221 History of Jazz
306 Chamber Singers
403 History and Literature of Music I
404 History and Literature of Music II
405 Music of the Baroque Period
406 Music of the Romantic Period
407 Modern Music from 1890 to the Present
408 The Symphony
409 Keyboard Music
410 Opera
411 The Art Song
412 Chamber Music

Courses in Music Education

424 Percussion Instruments
425 Woodwind Instruments
426 Brasswind Instruments
427 Voice Class
428 Stringed Instruments

Performance Organizations

- 300 University Band
- 301 University Choir
- 302 Brass Ensemble
- 303 Woodwind Ensemble
- 304 Percussion Ensemble
- 305 Opera Workshop
- 306 Chamber Singers
- 307 Recital Seminar
- 308 University Jazz Ensemble
- 309 University Orchestra

Courses in Applied Music

- 503 Score Reading and Conducting
- 550 Senior Recital
- 560 Accompanying
- 114 Applied Music Secondary I
- 214 Applied Music Secondary II
- 113, 213, 413, 513 Applied Music Principal I, II, III, IV
- 100 Diction for Singers

Courses for Advanced Undergraduates and Graduates

- 609 Music in Early Childhood
- 610 Music in Elementary School Today
- 611 Music in The Secondary School Today
- 614 Choral Conducting of School Music Groups
- 616 Instrumental Conducting of School Music Groups
- 618 Psychology of Music
- 620 Advanced Music Appreciation

Department of Physics

Jason Gilchrist, Chairperson

OBJECTIVES

The specific objectives of the Department are:

1. To prepare majors for graduate study and careers in physics, medicine and other professional fields.

2. To prepare majors for work in research and development laboratories.
3. To prepare majors to teach physics and mathematics in high school.
4. To provide majors in other departments with a clear understanding of the laws of physics and their applications.
5. To provide all students with the ability to make meaningful observations, to convert these observations into mathematical language, and to reach logical conclusions.

DEGREES OFFERED

Physics, Professional—B.S.
Physics, Secondary Education—B.S.
Engineering Physics—B.S.

GENERAL PROGRAM REQUIREMENTS

In addition to the general admission requirements of the University, a student must have two units of algebra, one unit of plane geometry, and $\frac{1}{2}$ unit of trigonometry.

DEPARTMENTAL REQUIREMENTS

Professional Physics Major—The major in professional physics must complete 124 semester hours of University courses. Included in the 124 semester hours are 42 semester hours of physics courses at the 200 level or above.

A student may complete requirements for a professional physics degree and also satisfy admission requirements for some medical schools by taking the following courses as electives: Biology 160, 140, 260 and Chemistry 221 & 222. Many medical schools may admit students after the completion of the third year of study.

Teaching Major in Physics—The teaching major must complete 124 semester hours of University courses. Included in these 124 hours are 30 semester hours of physics courses at the 200 level or above.

Engineering Physics Major—The major in engineering physics must complete 126 semester hours of University courses. Included in the 126 semester hours are 36 semester hours of physics and 25 semester hours in engineering.

ACCREDITATION

All Teacher Education Programs are accredited by the National Council for Accreditation of Teacher Education and approved by the North Carolina State Department of Public Instruction.

CAREER OPPORTUNITIES

A degree in physics will allow the student to go directly into research activity, study for an advanced degree, or teach in junior or senior high school. A study of physics may give the technical background usefulness in such fields as: Medicine, Law, Computer Science, Astronomy, or Business.

SUGGESTED CURRICULUM FOR MAJOR IN ENGINEERING PHYSICS

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Math 131	4
Social or Behav. Sci.	3
Mech. Eng. 103	2
Math 240	3
	15

<i>Second Semester</i>	Credit	Senior Year		<i>Second Semester</i>	Credit
English 101	3	<i>First Semester</i>	Credit	Social or Behavioral	
Math 132	4	Free Electives	3	Science	3
Physics 101 or 201	3	Elec. Engr. 320	3	Math 331	3
Physics 241	4	Elec. Engr. Lab 326	1	Physics 406	3
Physics Lab 251	1	Mech. Engr. 441	3	Chemistry 101	3
	15	Social & Behavioral		Chemistry 111	1
		Sciences	6	Physics 560	1
			16		14
Sophomore Year				Junior Year	
<i>First Semester</i>	Credit	<i>Second Semester</i>	Credit	<i>First Semester</i>	Credit
Physics 242	4	Physics 562	1	Chemistry 102	3
Physics Lab 252	1	Mech. Engr. 442	3	Chemistry 112	1
Math 231	4	Social & Behavioral		Physics 403	3
Chemistry 101	3	Sciences	3	Physics 401	3
Chemistry Lab 111	1	Free Electives	6	Math 332	3
Elective: Humanities or			13	Physics 600	3
Social Science	3				16
	16				
<i>Second Semester</i>	Credit			<i>Second Semester</i>	Credit
Physics 406	3	SUGGESTED CURRICULUM		Physics 561	1
Physics 403	3	GUIDE FOR A MAJOR IN		Physics 603	3
Math 331	3	PROFESSIONAL PHYSICS		Physics 423	2
Mech. Engr. 416	3	Freshman Year		Social or Behavioral	
Health or Phys. Ed.	2	<i>First Semester</i>	Credit	Science	6
Physics 423	2	Math 131	4	Elective	3
Physics 560	1	Physics 102	1		15
	17	English 102	2		
		English 100	3		
Junior Year		Physics 101 or 201	3	Senior Year	
<i>First Semester</i>	Credit	Math 240	3	<i>First Semester</i>	Credit
Physics 400	3		16	Physics 605	3
Physics 408	3	<i>Second Semester</i>	Credit	French, German or	
Math 332	3	English 101	3	Russian	3
Elec. Engr. 441	3	Physics 241	4	Physics 402	3
Elec. Engr. Lab 447	1	Physics Lab 251	1	Humanities, Elec.	6
Foreign Language	3	Math 132	4	Health or Phys. Ed.	1
	16	Humanities Elective	3		16
<i>Second Semester</i>	Credit		15	<i>Second Semester</i>	Credit
Physics 600	3	Sophomore Year		Physics 606	3
Physics 606	3	<i>First Semester</i>	Credit	French German or	
Elec. Engr. 442	3	Social or Behavioral		Russian	3
Elec. Engr. Lab 448	1	Science	3	Electives, Free	9
Indus. Engr. 460	2	Math 231	4	Physics 562	1
Foreign Language	3	Physics 242	4		16
Physics 561	1	Physics 252	1		
	16	Physics 400	3		
			15		

SUGGESTED CURRICULUM GUIDE FOR A TEACHING MAJOR IN PHYSICS

Freshman Year

<i>First Semester</i>	Credit
English 100	3
English 102	2
Math 131	4
Math 240	3
Physics 102	1
Physics 101 or 201	3
	<hr/> 16

<i>Second Semester</i>	Credit
English 101	3
History 100 or 204	3
Physics 241	4
Physics 251	1
Math 132	4
Physical Edu. 200	2
	<hr/> 17

Sophomore Year

<i>First Semester</i>	Credit
Biology 140	4
Phys. Ed.	1
Math 231	4
Physics 242	4
Physics Lab 252	1
Physics 400	3
	<hr/> 17

<i>Second Semester</i>	Credit
Biology 160	4
English 200	3
Speech 250	3
Physics 406	3
Physics 560	1
History 101 or 205	3
	<hr/> 17

Junior Year

<i>First Semester</i>	Credit
Chemistry 101	3
Chemistry 111	1
Physics 403	3
Education 300	2
Geography Elective	3
Elective	3
	<hr/> 15

<i>Second Semester</i>	Credit
Physics 501	1
Education 301	3
Psychology 320	3
English 201 or 203	3
Geography Elective	3
Phys. Ed. 102	1
	<hr/> 14

Senior Year

<i>First Semester</i>	Credit
Physics 562	1
Education 436	3
Physics Elective	3
Education 400	3
Physics 423	2
Chemistry 102	3
Chemistry 112	1
	<hr/> 16

<i>Second Semester</i>	Credit
Education 560	6
Education 500	3
Education 535	3
	<hr/> 12

DIRECTORY OF FACULTY AND COURSES

Physics

Stuart T. Ahrens, B.S., Beloit College; M.S., Ph.D., University of Wyoming; Associate Professor
 Maria R. Diaz, B.S., Instituto De La Vibora; M.S., Ph.D., University of Havana; Associate Professor
 Jason Gilchrist, B.S., Norfolk State College; M.S., Ph.D., Howard University; Professor and Chairperson
 Thomas R. Sandin, B.S., Santa Clara University; M.S., Ph.D., Purdue University; Professor
 Elvira S. Williams, B.S., North Carolina Central University; M.S., Ph.D., Howard University; Associate Professor

Courses

100 Introduction To Astronomy
 102 Physics Orientation
 200 Introductory Physics
 201 Survey of Physics
 210 Computers and Society
 211 Technical Physics I
 212 Technical Physics II
 216 Technical Physics I Laboratory
 217 Technical Physics II Laboratory
 225 College Physics I
 226 College Physics II
 235 College Physics I Laboratory
 236 College Physics II Laboratory
 241 General Physics I
 242 General Physics II
 251 General Physics I Laboratory
 252 General Physics II Laboratory
 400 Physical Mechanics I
 401 Mathematical Physics

402 Thermodynamics
 403 Electromagnetism I
 404 Physical Optics
 405 X-Ray Diffraction
 406 Introduction To Modern Physics
 408 Solid State Physics
 410 Introduction To Special Relativity
 411 Introduction to Astrophysics
 423 Physics Seminar
 430 Physics Research I
 431 Physics Research II
 560 Classical Experimental Physics
 561 Modern Experimental Physics I
 562 Modern Experimental Physics II
 600 Physical Mechanics II
 603 Electromagnetism II
 604 Electromagnetism III
 605 Quantum Mechanics I
 606 Nuclear Physics
 615 Quantum Mechanics II

Department of Political Science

Amarjit Singh, Chairperson

OBJECTIVES

The Department of Political Science offers courses in four principal fields: American Government, Public Policy and Administration, Political Theory and Methodology, and International Affairs.

The purpose of the department is to provide the students with the basic knowledge of theories, institutions, and processes of politics and public policy. The objectives are to develop an understanding of the operation of government at various levels, encourage students to engage in critical discourse of political and social problems, and to prepare students for advanced study.

The Department of Political Science has developed a Microcomputer Lab with funds received from the U.S. Department of Education. Political Science majors are advised

and guided into computer assisted instruction courses to develop their skills in content analysis and quantitative research techniques and computer literacy.

DEGREE OFFERED

Political Science—B.A.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree program in the Department of Political Science is based upon the general admission requirement of the University.

DEPARTMENTAL REQUIREMENTS

The major in political science must complete 124 semester hours of University courses. Included in the 124 semester hours are 34 hours of political science courses and 12 hours in a cognate area. A minimum grade of "C" must be attained in these courses.

Students desiring to minor in political science must complete 18 semester hours in political science including Political Science 200 and 210.

CAREER OPPORTUNITIES

A degree in political science prepares students for careers in government, public administration, law (for those continuing to law school), business, industry, foreign service, and leadership in civic and political activities.

CURRICULUM GUIDE FOR A MAJOR IN POLITICAL SCIENCE

Freshman Year	
<i>First Semester</i>	Credit
English 100	3
Mathematics 101 or 111	3
History 101	3
Health Education 200	2
Poli. Sci 100*	2

Poli. Sci. 200*	3
	16
<i>Second Semester</i>	
English 101	3
Mathematics 102 or 112	3
History 101	3
Biology Science 100	4
Poli. Sci. 210	3
	16

<i>Sophomore Year</i>	
<i>First Semester</i>	Credit
Foreign Language	3
Phy. Sci. 100 or	
Astronomy 101	3
Humanities 200	3
Speech 250	3
Poli. Sci. 220 or 250	3
Poli. Sci. 340*	3
	18

<i>Second Semester</i>	Credit
Foreign Language	3
Sociology 302	3
Poli. Sci. 310 or 444	3
Humanities 201	3
Psychology 320	3
Philosophy 260 or 262	3
	18

<i>Junior Year</i>	
<i>First Semester</i>	Credit
Poli. Sci. 333	3
Poli. Sci. 440	3
Economics 300	3
Poli. Sci. 350, 420, or 542	3
English 300 (Elective)	3
Cognate Area	
Elective**	3
	18

<i>Second Semester</i>	Credit
Poli. Sci. 334	3
Poli. Sci. 430 or 445	3
Poli. Sci. 448, 541 or 543	3
Economics 301	3
Cognate Area	
Elective**	3
	15

<i>Senior Year</i>	
<i>First Semester</i>	Credit
Poli. Sci. 642, 643 or 646	3
Cognate Area Elective**	3
Political Science	3
Internship	
Free Electives	3
	12
<i>Second Semester</i>	Credit
Poli. Sci. 644, 643 or 646	3
Speech 251 or Soc. 303	3
(Elective)	

Cognate Area Elective**	3
Free Electives	3
	12

* Required Political Science courses
** Students are advised to choose their cognate area requirement of twelve (12) credit hours from one of the following disciplines: English, Transportation, Economics, Business Administration, Sociology, Mass Communications, or History.
NOTE: Political Science Internship Credit will not be accepted to meet the major requirement of thirty-four (34) credit hours.

DIRECTORY OF POLITICAL SCIENCE FACULTY AND COURSES

Amarjit Singh, B.A., Punjab University; LL.B., University of Delhi; M.I.S., Ph.D., Claremont Graduate School; Professor and Chairperson
Phung Nguyen, B.A., M.A., National School of Administration, Saigon; M.B.A., Dalat University, Saigon; M.A., Ph.D., Duke University; Associate Professor
Charlie Jones, B.A., M.A., Ph.D., Ohio State University; Assistant Professor
Samuel A. Moseley, B.A., North Carolina A. and T. State University; M.A., Ph.D. Candidate, Ohio State University; Instructor
Benjamin Rawlins, B.S., Johnson C. Smith University; J.D. Georgetown University; Assistant Professor

- Courses
- *100 Orientation to Political Science
 - *200 American Government and Politics
 - *210 State and Local Government
 - 220 Blacks in the American Political System
 - 250 Introduction to Public Policy
 - 310 Comparative Politics
 - *333 Political Research Methods I
 - *334 Political Research Methods II
 - *340 Public Administration
 - 350 Public Personnel Administration
 - 400 Mass Political Attitudes and Behavior
 - 410 Public Policy and Technology
 - 420 Public Budgeting

- 430 Policy Analysis
- *440 Political Theory
- 444 International Relations
- 445 Problems of Contemporary Africa
- 448 Politics of Transportation
- 499 Internship I
- 504 Independent Study
- 505 Honors Seminar in Political Science
- 541 Party Politics and Pressure Groups
- 542 American Constitutional Law
- 543 Civil Liberties
- 544 International Organization
- 599 Internship II
- 604 Directed Study/Research
- 640 Federal Government
- 641 Seminar in State Political Problems
- 642 Modern Political Theory
- 643 Urban Politics and Government
- 644 International Law
- 645 American Foreign Policy—1945 to Present
- 646 The Politics of Developing Nations
- 653 Urban Problems

*Required

Department of Psychology

Emory Sadler, Chairperson

OBJECTIVES

The Department of Psychology serves the University by offering the undergraduate major in psychology and by providing service courses for other departments. The psychology program prepares students for graduate study in psychology and associated fields, as well as providing them with skills related to employment at the baccalaureate level.

DEGREES OFFERED

B.A. degree in Psychology.

DEPARTMENTAL REQUIREMENTS

Psychology major—The major in psychology must complete 124 semester hours of University courses. Included in the 124 semester hours are 55 hours of general education requirements, 47 hours of psychology courses, and 22 hours of free electives.

The Minor in Psychology—Students desiring to minor in psychology must complete Psy. 320, Psy. 322, and an additional 18 semester hours in psychology.

CAREER OPPORTUNITIES

To function as a professional psychologist, it is necessary to complete graduate training in the discipline. Career opportunities in psychology at the baccalaureate level are limited.

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN PSYCHOLOGY

Freshman Year

<i>First Semester</i>	Credit
Biology 100	4
English 100	3
History 100	3
Mathematics 101	3
Psychology 242	3
	16

<i>Second Semester</i>	Credit
Physical Science 100	3
Physical Science 110	1
English 101	3
Psychology 321	3
Mathematics 102	3
History 101	3
	16

Sophomore Year

<i>First Semester</i>	Credit
Foreign Language	3
Humanities 200	3
Speech 250	3
Psychology 322	4
Psychology 324	3
	16

<i>Second Semester</i>	Credit
Foreign Language	3
Humanities 201	3
Health Education 200	2
Psychology 325 or 326	3
Psychology 440	4
	15

Junior Year

<i>First Semester</i>	Credit
Psychology 420	3
Sociology	3
Humanities elective	3
Psychology elective	3
Free elective	3
Physical Education 101	1
	16

<i>Second Semester</i>	Credit
Zoology 461	4
Psychology 439	3
Psychology 434	3
Free elective	5
Physical Education 102	1
	16

Senior Year

<i>First Semester</i>	Credit
Psychology 542	3
Free electives	9
Psychology elective	3
	15

<i>Second Semester</i>	Credit
Psychology 540, 541, or 550	3
Free electives	5
Psychology elective	3
Psychology 544	3
	14

DIRECTORY OF FACULTY AND COURSES

Psychology Faculty

Mildred Bonner, R.N., Meharry Medical College; B.S., M.S., Tennessee A. and I. State University; Ph.D., University of North Carolina-Greensboro; Associate Professor

Hattie Liston, B.S., North Carolina College; M.A., New York University; Associate Professor

Eugene Runyon, B.S., M.S., Ph.D., Case Western Reserve University; Professor

Emory Sadler, B.S., M.S., North Carolina State University; Ph.D., Emory University; Associate Professor and Chairperson

Susan Schumacher, B.A., Roanoke College; M.A., Hollins College; Ph.D., The University of North Carolina at Greensboro; Associate Professor

Sarla Sharma, B.A., Banaras Hindu University; M.A., The University of Chicago; Ed.D., The University of North Carolina at Greensboro; Professor

provide Sociological background for students in the University and to prepare departmental majors for graduate study in Sociology or Social Work.

for advanced standing when they are admitted to graduate programs in Social Work.

The Social Work Program is accredited by the Council on Social Work Education and in cooperation with the School of Education is authorized to recommend candidates for Baccalaureate Certification in School Social Work.

DEGREES OFFERED

Sociology—B.A.
Bachelor of Social Work—B.S.W.

GENERAL PROGRAM REQUIREMENTS

Students are admitted to the department on the basis of general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

Sociology Major—Completion of a minimum of 124 semester hours of University courses. Included in the 124 semester hours are 46 hours of Sociology. A minimum grade of "C" must be achieved in these courses. Sociology majors are required to complete an 18 hour "concentration."

Social Work Major—Completion of a minimum of 124 semester hours of University courses. Included in the 124 semester hours are 41 semester hours of Social Work. A minimum grade of "C" must be achieved in these courses. Social Work majors are required to take 21 hours in Sociology.

Certification in School Social Work—Included in the 124 semester hours are the 35 semester hours in Social Work; 30 semester hours in Sociology and 5-6 hours in Education. A minimum grade of "C" must be achieved in these courses.

CAREER OPPORTUNITIES

A degree in Social Work provides students with the competencies essential for immediate entry into the professional field of Social Work. Since it is a nationally accredited program students may take courses which are sometimes used

A degree in Sociology is preparatory for graduate study in Sociology and can serve as the basic preparation for study of law, social work and public administration, entry into government service positions, and applied research.

SUGGESTED CURRICULUM GUIDE FOR BACHELOR OF ARTS DEGREE IN SOCIOLOGY

During the Freshman and Sophomore Years the following Courses should be completed:

Business Education 301	2
Biology 100 and Earth Science 201	7
English 100,101	6
Speech 250	3
Foreign Language (one language)	6
Health Education 200	2
Mathematics 101,102	9
Philosophy 262 and Phil. Elective	6
Sociology 100, 101, 204, 302, and 303	15
Sociology Elective	3
Sociology 301	3
Free Elective	3
Total Credits	65

During the Junior and Senior Years the following Courses should be completed:

Concentration in one of the following: Political Science, Economics, Psychology, Anthropology, History, Computer Science, and Mass Communication	18
English 300 and English Elective	6
Sociology 308 or 501, 402, 403, 671, 673, 674;	21
Suggested Sociology Electives:	
406, 669, 670	9
Sociology/Social Work 570	1
Free Electives	7
Total Credits	62

Department of Sociology and Social Work

Sarah V. Kirk, Chairperson

OBJECTIVES

The objectives of the Sociology/Social Work Department are to prepare students for careers at the baccalaureate level in Social Work; To

SUGGESTED CURRICULUM GUIDE FOR BACHELOR OF SCIENCE DEGREE IN SOCIAL WORK

During the Freshman and Sophomore Years the following Courses should be completed:

Political Science 200, 210, 443 or Economics 300, 301 and BA 422	9
Psychology 320 and 324 or 325 or Anthropology 200 and 300	6
Biology 100 and Earth Science 201	7
Mathematics 101, 102, 160	9
Foreign Language (one language)	6
English 100, 101	6
Speech 250	3
Health Education 200	2
Social Work 133 or appropriate elective	3
Sociology 100, 101, 204	9
Business Education (Typing)	2
Social Work Elective	3
Total Credits	65

During the Junior and Senior Years the following Courses should be completed:

English 300 and American or English Literature	6
Sociology 301, 402, 403, 674	12
Social Work 306, 307, 333, 334, 520, 571, 210	24
Philosophy 262 and 260 or 261 or 608	6
Sociology/Social Work 570	1
Social Work elective	3
Electives to total 124 semester hours	8-7
Total Credits	60

DIRECTORY OF FACULTY AND COURSES

Sociology/Social Work

Fasihuddin Ahmed, B.A., Forman Christian College; M.A., University of the Punjab; Ph.D., University of Chicago; Associate Professor

Christine Boone, B.A., North Carolina Central University; M.S.W., Rutgers University; D.S.W., Howard University; Assistant Professor

Robert Davis, B.A., Southern University; M.A., Atlanta University; Ph.D., Washington State University; Post-Doctoral, University of Wisconsin; Madison; Associate Professor

Abdulla Hagey, B.S., Portland State University; B.A., University of Pacific; C.P.H., Portland State University; A.A., College of San Mateo; M.S., University of Oregon; M.A., University of Oregon; M.A., University of Connecticut; Ph.D., University of Oregon; Associate Professor

David Johnson, B.A., Hamilton College; M.A., University of North Carolina at Chapel Hill; Ph.D., University of North Carolina at Chapel Hill; Associate Professor

James Johnson, B.S., North Carolina A&T State University; M.S.W., University of North Carolina at Chapel Hill; J.D., North Carolina Central University; Associate Professor

Sarah Kirk, B.A., St. Augustine College; M.S.W., Atlanta University; M.S., University of Pittsburgh; Ph.D., University of Pittsburgh; Associate Professor

Lawrence Shornack, B.A., Rutgers University; M.A., New York University; Ph.D., New York University; Associate Professor

Ruthena Smith, B.S., North Carolina A&T State University; M.S.W., University of Connecticut; Assistant Professor

Courses

100 Principles of Sociology
101 Basic Quantitative Analysis in Sociology
204 Social Problems
301 Origins of Social Thought
302 Social Statistics I
303 Social Statistics II
304 Social Aspects of Human Sexuality
305 Readings for Honors in Sociology
308 Family
312 Major Problems of Family Functioning
313 The Community
323 Introduction to Family Therapy

402 Social Theories
403 Research Methods I
406 Criminology
408 Independent Study I
501 Social Stratification
503 Juvenile Delinquency
671 Research Methods II
672 Selected Issues in Sociology
673 Population Studies
674 Evaluation of Social Programs
133 Social Professions, Fields and Services
210 Professional Relationship Skills
306 Social Functioning and Human Development
307 Field Instruction I & II
309 Disability and Employment
318 Practicum in the Community
320 Readings for Honors in Social Welfare
325 Honors Seminar in Social Service
333 Social Welfare
334 Social Work Methods I
372 Child Welfare I
374 Institutional Services for Children
200 Introduction to Anthropology
520 Independent Study—Social Service
300 Topics in Cultural Anthropology
420 Human Evolution in Ecological Perspective
603 Introduction to Folklore
650 Independent Study in Anthropology
651 Anthropological Experience
700 Seminar in Cultural Factors in Communication
310 Medical Sociology
311 Sociology of Mental Health
314 Black Experience
370 Aging in Society
515 Independent Study II
570 Senior Seminar
600 Seminar in Social Planning
601 Seminar in Urban Studies
625 Sociology/Social Service Internship
669 Small Groups
670 Law and Society
571 Social Work Methods II
373 Child Welfare II

Department of Speech Communication and Theatre Arts

Mary M. Tuggle, Chairperson

OBJECTIVES

The objectives of the Department of Speech Communication and Theatre Arts are as follows:

1. To develop students with competence in the total process of speech communication, traditional and contemporary.
2. To develop speech and theatre teachers, mass communication specialists, and professional theatricians with personal competence in speech communication.
3. To prepare students for successful study at the graduate level in various speech and theatre arts disciplines and in speech-oriented careers such as law, business, government, public relations, speech pathology/audiology and the ministry.
4. To develop in the student the power of independent and creative thinking, critical judgement, integrity and individual initiative.
5. To provide students with sufficient internships and study experiences in order for them to gain much needed vocational skills.
6. To provide a variety of speech courses to meet the University's general education requirements.

DEGREES OFFERED

Speech Communication and Theatre Arts—B.A.
Speech Communication and Theatre Education—B.A.
Professional Theatre—B.F.A.
Communications—B.A.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree programs in the Department of Speech Communication and Theatre Arts is based upon the general admission requirements of the University.

All majors in the Department of Speech Communication and Theatre Arts are expected to maintain a minimum grade point average of 2.0.

All communications majors must meet certain prerequisites prior to beginning sophomore level communications courses required in their chosen major. They must:

- a. make a grade of "C" or better in the grammar laboratory course.
- b. make a grade of "C" or better in the freshman composition courses.
- c. pass an oral proficiency test. Students who fail the proficiency test will be required to enroll in speech courses to develop acceptable oral communication skills.
- d. exhibit a minimum typing proficiency of 35 words per minute.

To remain in the communications program, a student must:

- a. maintain a minimum overall 2.5 grade point average in major courses.
- b. declare a minor by the sophomore year.
- c. complete an internship with an approved media organization.

DEPARTMENTAL REQUIREMENTS

Speech Communication and Theatre Arts Teaching Major—The teacher education major must complete a minimum of 124 semester hours of University courses. Included in the 124 semester hours are forty semester hours of speech and theatre courses at the 200 level or above and 25 semester hours of required education courses. A minimum grade of "C" must be achieved in these courses.

Speech Communication and Theatre Arts Non-Teaching Major—The nonteaching major in Speech Communication and Theatre Arts must complete a minimum of 124 semester hours of University courses. Included in these 124 semester hours are forty semester hours of speech and theatre courses and nine semester hours in English courses or allied electives at the 200 level or above. A minimum grade of "C" must be achieved in these courses.

Speech Pathology and Audiology Option—Students pursuing a pre-professional degree in speech pathology and audiology must complete a minimum of 124 semester hours of University courses. Included in the 124 semester hours are forty-six semester hours of speech communication courses at the 200 level or above. A minimum grade of "C" must be earned in these courses.

Communications Major—The communications major must complete a minimum of 124 semester hours of University courses. Included in these 124 semester hours are thirty-one semester hours of communication courses and a minimum of eighteen semester hours in a declared minor. A minimum grade of "C" must be earned in these courses.

Professional Theatre—A major in professional theatre must complete a minimum of 124 semester hours of University courses. Included in the 124 semester hours are fifty-two

semester hours of speech and theatre courses at the 200 level or above. A minimum of "C" must be achieved in these courses.

CAREER OPPORTUNITIES

Prospects of employment with a teaching degree in Speech Communication will vary dependent upon the geographic location and the academic areas one is certified to teach outside of Speech Communication. An advanced degree in teaching will provide more flexibility in the selection of available positions in public, private and parochial junior and senior high schools and in public colleges and universities.

A liberal arts degree in Speech Communication and Theatre Arts will prepare students for careers in personnel, public relations, and human relations. Corporations, consulting firms, manufacturing firms, educational institutions and state and local government agencies will provide many job opportunities in personnel and public relations. Competition at the entry level will be keen.

With a master's degree in speech pathology or audiology employment in clinics, schools, hospitals, state and federal government agencies, industry and private practice is favorable but competitive, dependent upon the geographic location. Competition for teaching positions in colleges and universities will be very keen.

Careers in theatre aside from acting are just beginning to unfold. Job opportunities in scene design and technical theatre, and theatre management are expected to increase with the advent of regional repertory theatres. To pursue a career in these areas, a graduate degree is necessary. A degree in professional theatre may also prepare students for careers in drama therapy, interior decorating and design and home planning.

Forecasts for the future of the communication industry are bright. With the development of electronic technology for information dissemination, all aspects of communication will thrive. Entry level positions are numerous but competition is very keen.

SUGGESTED CURRICULUM GUIDE FOR TEACHING SPEECH AND THEATRE ARTS

Bachelor of Arts

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Math 101	3
History 100	3
Biology 100	4
Physical Education	1
Education 100	1
	15

<i>Second Semester</i>	Credit
English 101	3
Math 102	3
History 101	3
Chemistry 100	4
Physical Education	1
Health Education 200	2
	16

Sophomore Year

<i>First Semester</i>	Credit
**Foreign Language (German, French, Spanish)	3
Humanities 200	3
Soc. Sci.	3
Theatre	3
Psychology 320	3
Speech 250	3
	18

<i>Second Semester</i>	Credit
**Foreign Language (German, French, Spanish)	3
Humanities 201	3
Speech 251	3
Speech 116	3
Education 300	2
Humanities Elec.	3
	17

Junior Year

<i>First Semester</i>	Credit
Education 301	2
Speech 380	3
Theatre 500	3
Speech 252	3
Theatre 302	3
	17

<i>Second Semester</i>	Credit
Education 400	3
Education 436	3
Theatre 501	3
Speech 420	3
Theatre 440	3
	15

Senior Year

<i>First Semester</i>	Credit
English 450	3
Speech 421	3
Education 539	3
Major Electives	5
	14

<i>Second Semester</i>	Credit
Education 500	3
Education 560	6
Education 624	5
	12

TOTAL HOURS 124

**** Take Elementary through Intermediate Level (12 hours) with no high school background in that particular language. Take Intermediate Level (6 hours) with a high school background in that particular language.**

SUGGESTED CURRICULUM GUIDE FOR PROFESSIONAL THEATRE MAJOR

Bachelor of Fine Arts

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Math 101	3
History 100	3
Biological Science 100	4
Speech 216	1
Health Education 200	2
	16

<i>Second Semester</i>	Credit
English 101	3
Math 102	3
History 101	3
Physics 101	3
Speech 250	3
Theatre 305	2
	17

Sophomore Year

<i>First Semester</i>	Credit
**Foreign Language (German, French, Spanish)	3
Humanities 200	3
Theatre 301	3
Theatre 302	3
Speech 421	2
Music 114	1
Major Elective (Theatre 652)	2
	17



<i>Second Semester</i>		Credit	Senior Year		SUGGESTED CURRICULUM FOR PROFESSIONAL THEATRE MAJOR BACHELOR OF FINE ARTS (Concentration: Acting)	
**Foreign Language (German, French, Spanish)		3	<i>First Semester</i>		Credit	
Humanities 201	3		Theatre 656 or 655	3		
Theatre 441	3		Theatre 630	3		
Psychology 320	3		Theatre 653 or 457	3		
Theatre 654	3		Free Elective	5		
	15			14		
Junior Year			<i>Second Semester</i>		Credit	
<i>First Semester</i>		Credit				
**Foreign Language	3		Theatre 651	3	<i>First Semester</i>	Credit
Theatre 500	3		Theatre 650	3	English 100	3
Theatre 400	3		Behavioral Sciences	3	Plant Science 201	3
Theatre 620	3		Theatre 667	3	Math 101	3
Theatre 442	3		Free Elective	3	Speech 116	1
	15			15	Health Educ.	2
<i>Second Semester</i>		Credit	TOTAL HOURS 124-125		History 100	3
**Foreign Language	3				Theatre 203	2
Theatre 501	3					17
Theatre 440	3				<i>Second Semester</i>	
Major Elective	3				Credit	
Humanities Electives	6				English 101	3
	15				Physics 101	3
					Math 102	3
					History 101	3
					Theatre 204	2
					Speech 117	1
					Art 224	2
						17

Sophomore Year

<i>First Semester</i>	Credit
For. Lang.	3
Speech 250	3
Sociology 100	3
Theatre 302	3
Theatre 303	3
Theatre Lab 100	1
Speech 118	1
	<hr/> 17

<i>Second Semester</i>	Credit
For. Lang.	3
Theatre 201	3
Psychology 320	3
Theatre 304	2
Theatre 442/441/444	3
Theatre Lab 200	1
	<hr/> 15

Junior Year

<i>First Semester</i>	Credit
Theatre 403	3
Psychology 650	3
Theatre 652	2
Theatre 500	3
Free Elective	3
Theatre Lab 300	1
Music 113/114	1
	<hr/> 16

<i>Second Semester</i>	Credit
Theatre 404	2
Theatre 501	3
Theatre 651/653	3
Speech 421	3
Theatre 405	2
Theatre Lab 400	1
Free Elective	3
	<hr/> 17

Senior Year

<i>First Semester</i>	Credit
Theatre 503	3
Theatre 630/631	3
Humanities Elective	3
Free Elective	3
	<hr/> 12

<i>Second Semester</i>	Credit
Theatre 504	2
Theatre 656/680	3
Theatre 667	3
Free Electives	5
	<hr/> 12

SUGGESTED CURRICULUM GUIDE FOR COMMUNICATIONS MAJOR

(Audio/Video Production Track)**Bachelor of Arts****Freshman Year**

<i>First Semester</i>	Credit
English 100	3
Math 101	3
History 100	3
Physics 200	2
Physical Educ. 109	1
Comm. 150	1
Elective	2
	<hr/> 15

<i>Second Semester</i>	Credit
English 101	3
Math 102	3
History 101	3
Biology 100	4
Physical Educ. 110	1
Speech 116	1
Comm. 131	1
	<hr/> 16

Sophomore Year

<i>First Semester</i>	Credit
**Foreign Language	3
English 200	3
Speech 250	3
Comm. 220	3
Comm. 202	3
	<hr/> 15

<i>Second Semester</i>	Credit
**Foreign Language	3
English 201	3
Comm. 345	3
Comm. 231	1
*Electives	6
	<hr/> 16

(Audio/Video Production Track)**Junior Year**

<i>First Semester</i>	Credit
*Electives	6
Comm. 304	3
Psychology 320	3
Comm. 303	2
Elective	2
	<hr/> 17

<i>Second Semester</i>	Credit
Speech 251	3
*Electives	3
Comm. 404	3
Comm. 331	1
Comm. 403	3
Humanities Elective	3
	<hr/> 16

Senior Year

<i>First Semester</i>	Credit
Comm. 422	3
Speech 636	3
*Electives	3
Comm. 413 or 414	3
Comm. 392	3
	<hr/> 15

<i>Second Semester</i>	Credit
Comm. 498	3
Social Science Elective	3
Free Electives	8
	<hr/> 14

TOTAL HOURS 124

*Required courses for the major
 **French, Spanish or German through
 Intermediate level

SUGGESTED CURRICULUM GUIDE FOR COMMUNICATIONS MAJOR

(Broadcast News Track)**Bachelor of Arts****Freshman Year**

<i>First Semester</i>	Credit
English 100	3
Math 101	3
History 100	3
Biology 100	4
Phy. Educ. 109	1
Elective	1
	<hr/> 15

<i>Second Semester</i>	Credit
English 101	3
Math 102	3
History 101	3
Phy. Educ. 110	1
Speech 116	1
Comm. 150	1
Chemistry 100, 110	4
	<hr/> 16

Sophomore Year

<i>First Semester</i>	Credit
**Foreign Language	3
English 200	3
Speech 250	3
Psychology 320	3
Comm. 131	1
Comm. 202	3
	<hr/> 16

<i>Second Semester</i>	Credit
**Foreign Language	3
English 201	3
Comm. 220	3
Speech 251	3
*Electives	3
	<hr/> 15

(Broadcast News Track)**Junior Year**

<i>First Semester</i>	Credit
Comm. 325	3
Comm. 304	3
Comm 303	3
*Electives	3
Political Science 200	3
	<hr/> 15

<i>Second Semester</i>	Credit
Phonetics 340	3
Comm. 345	3
Practicum 131	1
*Electives	6
Comm. 335	3
	<hr/> 16

Senior Year

<i>First Semester</i>	Credit
Comm. 422	3
Speech 636	3
Comm. 392	3
Comm. 231	1
*Electives	3
Speech 421	3
	<hr/> 16

<i>Second Semester</i>	Credit
Humanities Elective	3
Electives	6
Comm. 496	3
*Electives	3
	<hr/> 15

TOTAL HOURS 124

*Required courses for the minor
 **French, Spanish or German through
 Intermediate level

**SUGGESTED CURRICULUM
 FOR COMMUNICATIONS
 MAJOR**

(Print Journalism Track)**Bachelor of Arts****Freshman Year**

<i>First Semester</i>	Credit
English 100	3
Math 101	3
History 100	3
Bio. Science 100	4
Phys. Educ. 109	1
English 102	2
	<hr/> 16

<i>Second Semester</i>	Credit
English 101	3
Math 102	3
History 101	3
Chemistry 100, 110	4
Phys. Educ. 110	1
Comm. 150	1
	<hr/> 15

Sophomore Year

<i>First Semester</i>	Credit
**Foreign Language	3
Humanities 200	3
Comm. 220	3
English 210	3
Comm. 202	3
	<hr/> 15

<i>Second Semester</i>	Credit
**Foreign Language	3
Humanities 201	3
Speech 250	3
Comm. 230	3
Elective	3
Comm. 131	1
	<hr/> 16

Junior Year

<i>First Semester</i>	Credit
Psychology 320	3
Comm. 320	3
Comm. 231	1
Comm. 392	3
*Electives	6
	<hr/> 16

<i>Second Semester</i>	Credit
English 431	3
Comm. 340	3
*Electives	6
Comm. 330	3
	<hr/> 15

Senior Year

<i>First Semester</i>	Credit
Soc. 100	3
Political Science 200	3
Comm. 376	3
Comm. 402	2
*Electives	6
	<hr/> 17

<i>Second Semester</i>	Credit
Comm. 498	3
Electives	11
	<hr/> 14

TOTAL HOURS 124

*Required courses for the major
 **French, Spanish or German through
 Intermediate level

**SUGGESTED CURRICULUM
 GUIDE FOR
 COMMUNICATIONS MAJOR**

(Public Relations Track)**Bachelor of Arts****Freshman Year**

<i>First Semester</i>	Credit
English 100	3
Math 101	3
History 100	3
Bio. Science 100	4
Phy. Educ. 109	1
English 102	2
	<hr/> 16

<i>Second Semester</i>	Credit
English 101	3
Math 102	3
History 101	3
Chemistry 100, 110	4
Comm. 150	1
Phy. Educ. 110	1
	<hr/> 15

Sophomore Year

<i>First Semester</i>	Credit
**Foreign Language	3
Humanities 200	3
Comm. 202	3
Comm. 220	3
*Electives	3
	<hr/> 15

<i>Second Semester</i>	Credit
**Foreign Language	3
Humanities 201	3
Speech 250	3
Comm. 230	3
*Electives	6
	<hr/> 18

Junior Year		<i>Second Semester</i>		<i>Second Semester</i>	
<i>First Semester</i>	Credit	English 101	Credit	Speech 450	Credit
Psychology 320	3	Math 102	3	Speech 510	3
Comm. 320	3	History 101	3	Free Electives	6
Comm. 392	3	Biology 461	4	Sociology 302	3
Comm. 376	3	Physical Education 101 or			15
Comm. 131	1	Health Education 100	1-2	TOTAL HOURS 124-125	
*Electives	3	Art 224	2	** Take Elementary through Intermediate Level (12 hours) with no high school background in that particular language. Take Intermediate Level (6 hours) with a high school background in that particular language.	
	16		16-17		
<i>Second Semester</i>	Credit	Sophomore Year			
English 431	3	<i>First Semester</i>	Credit	DIRECTORY OF FACULTY AND COURSES	
Comm. 340	3	**Foreign Languages			
Comm. 386	3	(German, French, Spanish)	3		
Comm. 231	1	Humanities 200 or 202	3	Faculty	
*Electives	6	Psychology 320	3		
	16	Speech 250	3		
Senior Year		Sociology 100	3	Kenneth Campbell, B.A., East Carolina University; M.S., Columbia University; Instructor	
<i>First Semester</i>	Credit	Speech 380	3		
Comm. 402	2		18		
Comm. 496	3	<i>Second Semester</i>	Credit	Donald E. Coffey, B.A., South Carolina State College; M.A., Northern Arizona University; Lecturer	
Political Science 200	3	**Foreign Languages			
English 331	3	(German, French, Spanish)	3		
Electives	3	Humanities 201 or 202	3	H. D. Flowers, II, B.A., Grambling State University; M.A., Florida Atlantic University; M.F.A., Yale University; Ph.D., Southern Illinois University; Executive Director, Paul Robeson Theatre, Professor	
	14	Electives	3		
<i>Second Semester</i>	Credit	English 300	3		
Soc. 100	3	Speech 216	1	Lois B. Kinney, B.A., Wilberforce University; M.A., Ohio State University; Ph.D., Ohio State University; Professor	
Comm. 498	3	Music 216	3		
Electives	8		16		
	14	Junior Year		Charlene Middleton, B.A., N.C. A&T State University; M.S., Columbia University, NY	
TOTAL HOURS 124		<i>First Semester</i>	Credit		
*Required courses for the minor		Major Elective	3		
**French, Spanish or German through Intermediate level		(Theatre 620)	3	Richard Moore, B.S., North Carolina A&T State University; M.S., Columbia University; Ed.D., University of North Carolina at Greensboro; Associate Professor	
		Speech 340	3		
		Speech 407	3		
		Speech 415	3	R. Paul Thomason, B.A., South Carolina State College; M.Ed., Bowie State University	
		Free Electives	3		
		(Speech 421)	3		
			15	Nagatha Tonkins, M.A., North Carolina A&T State University; B.A., North Carolina A&T State University; Lecturer	
SUGGESTED CURRICULUM GUIDE FOR SPEECH PATHOLOGY OPTION—MAJOR CODE		<i>Second Semester</i>	Credit		
(Speech Communication and Theatre Arts Major)		Speech 404	3		
Bachelor of Arts		Speech 425	3	Mary M. Tuggle, B.S., Hampton Institute; M.Ed., Marygrove College; Ph.D., Michigan State University; Associate Professor and Chairperson	
Freshman Year		Major Electives	3		
<i>First Semester</i>	Credit	(Speech 420, 636)	6		
English 100	3	Free Electives	15	Anthony Welborne, B.S., N.C. A&T State University; M.S., N.C. A&T State University	
Math 101	3	Senior Year			
History 100	3	<i>First Semester</i>	Credit		
Biological Science 100	4	Speech 430	3		
Physical Education 101 or		Speech 431	3		
Health Education 200	1-2	Free Elective	3		
Free Elective		Speech 550	3		
(Including ROTC)	1	Speech 251	3		
	15-16		15		

Courses

Courses in Speech

- 116 Voice and Diction Lab I
- 117 Voice and Diction Lab II
- 118 Development of General American Speech Patterns
- 119 Speech Improvements for Foreign Students
- 250 Speech Fundamentals
- 252 Argumentation Procedures
- 253 Parliamentary Procedures
- 335 Rhetoric of American Thought
- 340 Phonetics
- 380 Introduction to Speech Pathology
- 404 Voice and Articulation Disorders
- 407 Introduction to Audiology
- 415 Anatomy and Physiology of the Ear and Vocal Mechanism
- 420 Group Discussion
- 421 Oral Reading and Interpretation
- 425 Principles of Audiometry
- 430 Development of Speech and Language in Children
- 431 Organic Disorders
- 450 Aural Rehabilitation
- 510 Introduction to Stuttering
- 539 Methods of Teaching Speech and Theatre
- 550 Clinical Practicum I
- 551 Clinical Practicum II
- 633 Speech for Teachers
- 636 Persuasive Communication

Courses in Communication

- 131 Practicum I
- 150 Grammar Lab for Communicators

- 202 Introduction to Mass Media
- 220 News Writing
- 230 Public Affairs Reporting
- 231 Practicum II
- 302 Minorities in Mass Media
- 303 Television Production I
- 304 Radio Production I
- 312 Survey of Visual Styles
- 313 Video Editing
- 320 News Editing and Layout
- 325 Broadcast News Writing
- 330 Reporting Techniques for Broadcast Media
- 340 Feature Writing
- 345 Writing for Radio and Television
- 376 Public Information & Public Relations Techniques
- 386 Advanced Public Relations
- 392 Communications Law and Ethics
- 402 Current Issues in Mass Communications
- 403 Television Production II
- 404 Radio Production II
- 413 Advanced Video Production
- 414 Audio Production
- 422 Broadcast Management and Programming
- 423 Field Production
- 431 Practicum IV
- 440 Editorial Writing
- 486 Print and Radio/TV Advertising
- 492 Cable Television Seminar
- 496 Publications Design and Layout

Courses in Theatre

- 201 Drama Appreciation
- 203 Theatre Movement I
- 204 Theatre Movement II

- 302 Elements of Play Production
- 303 Acting I
- 304 Studio Acting I
- 305 Theatre Movement
- 403 Acting II
- 404 Studio Acting II
- 405 Improvisational Theatre
- 440 Play Directing
- 441 Stagecraft
- 442 Stage Lighting
- 443 Scene Design
- 444 Stage Management
- 457 Essentials of Playwriting
- 500 History of Theatre I
- 501 History of Theatre II
- 503 Studio Acting III
- 504 Theatre Laboratory IV
- 620 Creative Dramatics
- 630 Black American Drama
- 631 Modern American Drama and Theatre
- 650 Theatre Management
- 651 Children's Theatre
- 652 Stage Make-Up
- 653 Principles and Practice
- 655 Advanced Play Production
- 656 Advanced Directing
- 667 Seminar in Theatre

Laboratory Courses

- 100 Speech and Theatre Laboratory
- 200 Speech and Theatre Laboratory
- 300 Speech and Theatre Laboratory
- 400 Speech and Theatre Laboratory

Advanced Undergraduate Course

- 680 Independent Study in Speech Communication and Theatre Arts

SCHOOL OF BUSINESS AND ECONOMICS

Quiester Craig, Dean
Danny Pogue, Assistant Dean

OBJECTIVES

A primary goal of the School of Business and Economics is to develop business leaders who are capable of coping with new technologies and social progress. Associated with this goal is a commitment to the objectives of quality instruction, research, professional development, and to programs and service for the community, state, and nation. The School of Business and Economics also serves to perpetuate a general understanding and appreciation for the interrelationships of the national as well as world environments. The scope of the School's programs includes curricula based primarily upon key concepts and skills necessary for decision-making and problem-solving roles in business, industry, government, and education.

ACCREDITATION

The undergraduate business programs of the School of Business and Economics are accredited by the American Assembly of Collegiate Schools of Business (AACSB).

DEGREES OFFERED

Accounting—B.S.
Administrative Services—B.S.
Business Administration—B.S.
Business Education (Basic)—B.S.
Business Education (Comprehensive)—B.S.
Economics—B.S.
Transportation—B.S.

COURSE LOAD

The normal course load is fifteen to seventeen (15-17) credit hours. A full-time undergraduate student is required to carry a minimum of twelve (12) credit hours. Students majoring in the School of Business and Economics *may not* enroll for more than eighteen (18) credit hours without the approval of the Department Chairperson and the Dean.

GENERAL PROGRAM REQUIREMENTS

The student is held responsible for the selection of courses in conformity with the curriculum of his/her choice. A student who enters the School of Business and Economics has the privilege of graduating under the provisions of the Bulletin current upon admission provided all requirements are completed within six years. If all requirements are not completed within six years after admission, the student is expected to conform to the Bulletin requirements specified for the class with which graduation is anticipated.

The applicant for graduation must have earned a minimum of 124 semester hours, excluding deficiency and/or remedial course work, with a cumulative grade point average of 2.00 or better for all courses taken. Students in the School of Business and Economics must earn a minimum grade of "C" in English 100, 101; Mathematics 111, 112; and, BE 360. Students must also present a minimum cumulative grade point average of 2.00 in the major field of study which includes the minimum of a "C" grade in at least 8 (24 hours) of the 10 (30 hours) courses listed as major program requirements in the applicable University Bulletin for the selected courses of study. (Economics majors should check program for major program requirements).

PROFICIENCY EXAMINATIONS

Students who have had some training or experience in certain fields offered in the School of Busi-

ness and Economics will be given an opportunity to take an examination with the permission of the Chairperson of the Department and the approval of the Dean of the School of Business and Economics. A student who passes a proficiency examination is given credit toward graduation, provided that the course is acceptable for his/her curriculum. Credit is given only if a grade of "C" is made on the examination. A grade of "P" is recorded on the student's record. No official record is made of failures on these examinations.

Proficiency examinations are given under the following restrictions:

1. Examinations may be taken only by persons who are in residence at the University.
2. Examinations may not be taken to raise grades or remove failures in courses.
3. Examinations may be taken only once in the same course.

SENIOR RESIDENCE REQUIREMENT

Students must complete a minimum of three semesters as a full-time student in residence at the University which includes the two semesters prior to graduation. At least one half of the student's credit hours in the major field must be earned at the University. Exception to either of these provisions may be made upon the recommendation of the Chairperson of the student's major department and the approval of the Dean of the School of Business and Economics.

SCHOOL REQUIREMENTS

All business programs require the completion of Business and Economics Core requirements including the following courses: ACC 221, 222, BE 360, BA 341, 422, 430, 461, 453, 481, 520, and Econ. 415, (BA 440 or BA 551 required for accounting majors. BE 379 required for Business Education majors instead of Econ. 415).

BETA GAMMA SIGMA

Beta Gamma Sigma is the national scholastic honor society for majors in programs in the School of Business and Economics. The North Carolina A&T State University Chapter was established in 1980 as a result of the accreditation of the undergraduate business programs in 1979. Membership is a signal honor and is limited to outstanding students who give promise of success in the field of business based upon their character and academic performance, and who rank in the upper 5 percent of the junior class or the upper 10 percent of the senior class.

Department of Accounting

Mark Kiel, Chairperson

OBJECTIVES

The successful practice of accounting today requires both technical competence in accounting and a thorough understanding of the economic environment in which accounting operates. Only by understanding the objectives and constraints of the economic environment is the accountant able to apply technical competence toward the solution of business problems. The objectives of the Accounting program are to present a broad exposure to the related business disciplines and to provide quality instruction, research in accounting and accounting education, and service to the community. The curriculum also provides the opportunity for interested students to prepare for the CPA Examination.

ACCREDITATION

The undergraduate accounting program is accredited by the American Assembly of Collegiate Schools of Business (AACSB).

DEGREE OFFERED

Accounting—B.S.

GENERAL PROGRAM REQUIREMENTS

The major in Accounting must complete a minimum of 124 semester hours consistent with the curriculum guide presented below. Accounting majors must earn a minimum grade of "C" in English 100, 101, Mathematics 111, 112 and B.E. 360.

DEPARTMENTAL REQUIREMENTS

Majors in the department must earn a minimum grade of "C" in at least 8 (24 hours) of the 10 (30 hours) courses listed as major program requirements for Accounting in the applicable University Bulletin. Also, students *must* earn a minimum grade of "C" in *each* of the following Accounting courses: Accounting 221, 222, 441, and 442.

CAREER OPPORTUNITIES

Students majoring in Accounting will be prepared for careers in public and/or corporate accounting, business and government, and receive quality instruction for a background for graduate study.

CURRICULUM GUIDE FOR THE MAJOR IN ACCOUNTING

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Mathematics 111	4
Political Science (Elective) ¹	3
Humanities (Elective) ²	3
Natural Science (Elective) ³	3-4
Physical Education ⁵	1
Elective	
	<hr/> 17-18



<i>Second Semester</i>	Credit
English 101	3
Mathematics 112	4
Humanities (Elective) ⁴	3
Natural Science (Elective) ³	3-4
Business Administration 220	3
Physical Education ⁵ Elective	1
	<hr/> 17-18

Sophomore Year

<i>First Semester</i>	Credit
Accounting 221	3
Economics 300	3
Business Administration 341	3
Economics 305	3
Psychology 320	3
Nonbusiness Electives ⁶	2
	<hr/> 17

<i>Second Semester</i>	Credit
Accounting 222	3
Economics 301	3
Economics 310	3
Business Education 360	3
Business Education 342	3
Speech 250	3
	<hr/> 18

Junior Year

<i>First Semester</i>	Credit
Accounting 441	3
Accounting 444	3
Business Administration 422	3
Business Administration 453	3
Business Administration 481	3
	<hr/> 15

<i>Second Semester</i>	Credit
Accounting 442	3
Accounting 562	3
Business Administration 430	3
Business Administration 440 or 551	3
Business Administration 482	3
	<hr/> 15

Senior Year

<i>First Semester</i>	Credit
Accounting 443	3
Accounting 545	3
Business Administration 461	3
Nonbusiness Electives ⁷	6
	<hr/> 15

<i>Second Semester</i>	Credit
Accounting 561	3
Accounting Electives ⁸	3
Business Administration 462 or 463 ⁹	3
Business Administration 520	6
	<hr/> 12

*Major Program Requirements:	Semester Hours
Accounting 221—Principles of Accounting I	3
Accounting 222—Principles of Accounting II	3
Accounting 441—Intermediate Accounting I	3
Accounting 442—Intermediate Accounting II	3
Accounting 443—Income Tax Accounting	3
Accounting 444—Cost Accounting	3
Accounting 545—Advanced Accounting	3
Accounting 561—Auditing Principles	3
Accounting 562—Accounting Systems	3
Bus. Adm. 453—Business Finance	3
	<hr/> 30

** All majors must earn a minimum grade of "C" in at least 8 (24 hours) of the 10 (30 hours) courses listed as major program requirements in the applicable University Bulletin for the selected area of study. Also, the student must earn a minimum grade of "C" in each of the following four accounting courses: 221, 222, 441, 442.*

¹ Political Science 200, 210 or 220.

² Recommended Courses: Music 216, 220, 221; courses from Art; Foreign Language.

³ Recommended Courses: Biological Science 100; Physical Science 100; Introduction to Astronomy 101; Earth Science 201.

⁴ Recommended Courses: Music 216, 217, 220, 221; Humanities 200, 201; courses from Art; Foreign Language; History 262.

⁵ Recommended courses: Phy. Ed. 107, 344, 441.

⁶ Recommended courses: Speech 216; English 102; Phy. Ed. 107, 344, 441.

⁷ Recommended courses: English 260, 300, 450; Speech 251, 420; or additional courses in mathematics and computer science.

⁸ From Acct. 445, 590, and 643. Students planning to take the CPA Exam should elect Acct. 590 and/or 643.

⁹ Students planning to take the CPA Exam should elect Business Administration 463.

DIRECTORY OF FACULTY AND COURSES

Accounting

William D. Cooper, B.B.A., Georgia State University; M.B.A., Georgia State University; Ph.D., University of Arkansas; CPA; Associate Professor

Quiester Craig, B.A., Morehouse College; M.B.A., Atlanta University; Ph.D., University of Missouri at Columbia; CPA; Professor and Dean

Lawrence Gulley, B.S., Florida A&M University; M.B.A., University of Miami; Ph.D., Texas A&M University; Assistant Professor

Gwendolyn Highsmith, B.S., North Carolina A&T State University; M.B.A., University of Wisconsin at Madison; CPA; Ph.D., University of Houston; Assistant Professor

Helen Kennedy, B.S., Southern University; M.B.A., Louisiana Tech University; Ph.D., Oklahoma State University; Associate Professor

Mark Kiel, B.S., Alabama State University; M.B.A., Atlanta University; Ph.D., University of Georgia; CPA; Associate Professor and Chairperson

*Charles Malone, A.B., Boston University College of Liberal Arts; J.D., Boston University School of Law; M.B.A., Columbia University Graduate School of Business; CPA; Assistant Professor

Ida Robinson, B.A., Fisk University; M.A., Columbia University; M.B.A., St. John's University; CPA; Ph.D. Candidate, University of Missouri Instructor

Jerry Thorne, B.S., North Carolina A&T State University; M.B.A., University of Wisconsin at Madison; CPA; Instructor

**On Leave during the 1988-89 year.*

Andre Vonsiatsky, B.A., University of South Florida; M.B.A., Wake Forest University; CPA; Instructor
 Diana Williams, B.S., North Carolina A&T State University; M.B.A., Duke University; CPA; Instructor

Courses

- 221 Principles of Accounting I
- 222 Principles of Accounting II
- 441 Intermediate Accounting I
- 442 Intermediate Accounting II
- 443 Income Tax Accounting
- 444 Cost Accounting
- 445 Selected Topics in Accounting
- 446 Managerial Accounting
- 545 Advanced Accounting
- 561 Auditing Principles
- 562 Accounting Systems
- 590 Seminar in Accounting Theory
- 643 Advanced Income Tax Accounting

Department of Business Administration

Georgia W. Bowser, Chairperson

OBJECTIVES

The objectives of the Business Administration Department are to provide fundamental knowledge concerning the field of business administration by emphasizing the tools essential for problem solving and decision making and to develop competencies necessary for accomplishing managerial goals.

DEGREES OFFERED

Business Administration—B.S.

GENERAL PROGRAM REQUIREMENTS

The students majoring in Business Administration must complete a minimum of 124 hours consistent with the curriculum guide for the area of study selected. Business Administration majors must earn a minimum grade of "C" in English 100, 101, Mathematics 111, 112, and B.E. 360.

DEPARTMENTAL REQUIREMENTS

Majors in the Department of Business Administration must select an area of study in banking and finance, management, or marketing. They must earn a minimum grade of "C" in 8 (24 hours) of the 10 (30 hours) courses identified as major program requirements in the applicable University Bulletin for the selected area of study.

CAREER OPPORTUNITIES

Having earned a degree in Business Administration, students will have acquired the technical preparation and competencies important for careers in such specific fields as banking and finance, management, and marketing. Flexibility within the degree program provides students with the academic preparation necessary for administrative-based careers in public, private, and entrepreneurial activity.

CURRICULUM GUIDE FOR THE MAJOR IN BUSINESS ADMINISTRATION

The following courses will be taken by all Business Administration Majors:

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Social Science Elective ¹	3
Natural Science Elective ²	3-4
Mathematics 111	4
BA 220—Business Environment	3
	16-17

<i>Second Semester</i>	Credit
English 101	3
Social Science Elective ¹	3
Natural Science Elective ²	3-4
Mathematics 112	4
Health & Physical Ed. Electives	3
	16-17

Sophomore Year

<i>First Semester</i>	Credit
Economics 300	3
Humanities Elective ³	3
Economics 305	3
Accounting 221	3
Speech 250	3
Psychology 320	3
	18

<i>Second Semester</i>	Credit
Economics 301	3
Humanities Elective ³	3
Economics 310	3
Accounting 222	3
BA 341—Intro. to Management Info. Systems	3
	15

¹ Recommended Courses: History 100, 101, 215, 216, 310, 311; Geography 200 and 322; Political Science 200, 210; Sociology 100 and 200.

² Recommended Courses: Biological Science 100; Physical Science 100; Introduction to Astronomy 101; Survey of Physics 201; Plant Science 201.

³ Recommended Courses: Humanities 200, 201; and courses from Art, Music, and/or Literature; Foreign Languages.

BANKING AND FINANCE

Junior Year

<i>First Semester</i>	Credit
BA 481—Management Science	3
BA 422—Intro. to Management	3
BA 453—Business Finance	3
AC 441—Intermediate Accounting I	3
EC 415—Money and Banking	3
	15

<i>Second Semester</i>	Credit
BA 482—Production Management	3
BE 360—Business Communications	3
BA 455—Investments	3
AC 442—Intermediate Accounting II	3
BA 550—Financial Analysis	3
	<u>15</u>

Senior Year

<i>First Semester</i>	Credit
BA 430—Marketing	3
BA 461—Legal Environment of Business	3
BA 551—Financial Management	3
Finance Elective ⁴	3
Nonbusiness Elective	3
	<u>15</u>

<i>Second Semester</i>	Credit
BS 462—Business Law	3
BA 520—Business Policy	3
BA 556—Financial Markets	3
Finance Elective ⁴	3
Nonbusiness Elective	3
	<u>15</u>

Major Program Requirements:	Semester Hours
BA 422—Introduction to Management	3
BA 462—Business Law	3
BA 453—Business Finance	3
BA 455—Investments	3
BA 550—Financial Analysis	3
BA 551—Financial Management	3
BA 556—Financial Markets	3
Accounting 441—Intermediate Accounting I	3
Accounting 442—Intermediate Accounting II	3
Economics 310—Advanced Statistics	3
	<u>30</u>

⁴ Select two courses from the following: courses BA 464; BA 465; BA 552; Economics 410, 420, and 510, additional courses in Accounting or Computer Science in consultation with advisor.

MANAGEMENT	
Junior Year	
<i>First Semester</i>	Credit
BA 481—Management Science	3
BA 422—Intro. to Management	3
BA 453—Business Finance	3
BA 430—Marketing	3
AC 446—Managerial Accounting	3
	<u>15</u>
<i>Second Semester</i>	Credit
BA 482—Production Management	3
BE 360—Business Communications	3
BA 550—Financial Analysis	3
BA 539—Marketing Management	3
EC 415—Money and Banking	3
	<u>15</u>

Senior Year

<i>First Semester</i>	Credit
BA 461—Legal Environment of Business	3
BA 522—Personnel Management	3
Management Electives ⁵	6
Nonbusiness Electives	3
	<u>15</u>
<i>Second Semester</i>	Credit
BA 520—Business Policy	3
BA 462—Business Law	3
Management Elective ⁵	3
Nonbusiness Electives	6
	<u>15</u>

Major Program Requirements:	Semester Hours
Accounting 446—Managerial Accounting	3
BA 422—Introduction to Management	3
BA 430—Marketing	3
BA 539—Marketing Management	3
BA 462—Business Law	3
BA 453—Business Finance	3
BA 481—Management Science	3
BA 522—Personnel Management	3
BA 550—Financial Analysis	3
Economics 310—Advanced Statistics	3
	<u>30</u>

⁵ Select nine hours from courses in the School of Business and Economics or additional courses in Computer Science or English and Speech in consultation with Advisor.

MARKETING	
Junior	
<i>First Semester</i>	Credit
BA 481—Management Science	3
BA 430—Marketing	3
BA 422—Intro to Management	3
BA 453—Business Finance	3
AC 446—Managerial Accounting	3
	<u>15</u>
<i>Second Semester</i>	Credit
BA 482—Production Management	3
BA 431—Marketing Communications	3
BA 437—Consumer Behavior	3
EC 415—Money and Banking	3
BE 360—Business Communications	3
	<u>15</u>

Senior Year

<i>First Semester</i>	Credit
BA 461—Legal Environment of Business	3
BA 538—Marketing Research	3
Marketing Elective ⁶	3
Nonbusiness Electives	6
	<hr/> 15

<i>Second Semester</i>	Credit
BA 520—Business Policy	3
BA 462—Business Law	3
BA 539—Marketing Management	3
Marketing Elective ⁶	3
Nonbusiness Elective	3
	<hr/> 15

Major Program Requirements:	Semester Hours
BA 422—Introduction to Management	3
BA 430—Marketing	3
BA 431—Marketing Communications	3
BA 437—Consumer Behavior	3
BA 538—Marketing Research	3
BA 539—Marketing Management	3
BA 462—Business Law	3
BA 481—Management Science	3
Accounting 446—Managerial Accounting	3
Economics 310—Advanced Statistics	3
	<hr/> 30

⁶ Select six credit hours from the following: BA 420; BA 433; BA 435; BA 440; BA 537; Psychology 420; courses in Transportation; Speech/English, and Computer Science in consultation with advisor.

DIRECTORY OF FACULTY AND COURSES

Business Administration

Robert J. Angell, B.S.B.A. University of North Carolina at Chapel Hill; M.B.A., University of Virginia; D.B.A., Florida State University; Professor
Chiekwe Anyansi-Archibong, B.S., M.B.A., Ph.D., University of Kansas; Assistant Professor

Willard R. Bagwell, B.S., University of North Carolina at Chapel Hill; M.B.A., Ph.D., Georgia State University; Associate Professor
Georgia W. Bowser, B.S., North Carolina Central University; M.S., Ph.D., University of Wisconsin-Madison; Associate Professor and Chairperson
Betty L. Brewer, B.S., East Carolina University; M.B.A., D.B.A., Kent State University; Associate Professor
James R. Brown, Jr., B.S., M.S., University of Tennessee; Ed.D., University of Georgia; Associate Professor
Rowland C. Chidomere, B.A., Central State University; M.B.A., Central State University; Ph.D., University of Oklahoma; Assistant Professor
Karlene M. Crawford, B.S., University of Southwestern Louisiana; M.B.A., University of Wisconsin; Ph.D., University of Georgia; Assistant Professor
Richard S. Ellis, B.S., Lindenwood College; M.B.A., University of Wisconsin; Ph.D., University of Georgia; Assistant Professor
Lawrence M. Glisson, B.S., M.A., East Carolina University; M.B.A., Ph.D., The American University; Associate Professor and Director of the Transportation Institute
Robert L. Howard, B.A., William College; M.B.A., University of Chicago; Ph.D., Ohio State University; Associate Professor
Paul Lee, B.S., Providence College of Agriculture, M.S., National Chungshing Univ.; Ph.D., Washington State University; Associate Professor
Mary R. Lind, B.S., Duke University; M.B.A., University of North Carolina at Chapel Hill; Ph.D., Candidate, University of North Carolina at Chapel Hill; Assistant Professor
Pavlos Michaels, B.A., B.A., Cyprus College (Greece); M.A., M.P.A., Ph.D., The University of Alabama, Tuscaloosa; J.D., The University of Alabama, Birmingham; Assistant Professor
Japhet H. Nkonge, B.A., North Carolina A. and T. State University; M.B.A., Rutgers University; Ph.D., University of North Carolina at Chapel Hill; Professor

Laura L. Perry, B.S., University of North Carolina at Chapel Hill; M.B.A., University of North Carolina at Greensboro; Instructor
Danny H. Pogue, B.A., Texas College; M.A., Texas Southern University; Ph.D., The Ohio State University; Associate Professor and Assistant Dean
Alonzo Redmon, B.S., University of Missouri at Columbia; M.B.A., Indiana University; Ph.D., University of North Carolina at Chapel Hill; Assistant Professor
Joanne M. Sulek, B.S., Wake Forest University; M.A., Wake Forest University; Ph.D., Candidate, University of North Carolina at Chapel Hill; Assistant Professor
LeVon Wilson, B.S.B.A., Western Carolina University; J.D., North Carolina Central University; Assistant Professor

Courses

220 Business Environment
341 Introduction to Management Info. Systems
420 Human Behavior in Business
422 Introduction to Management
425 Small Business Management
430 Marketing
431 Marketing Communications
433 Retailing
435 Sales Management
437 Consumer Behavior
440 Business Information Systems
453 Business Finance
455 Investments
461 Legal Environment of Business
462 Business Law
463 Commercial Law
464 Risk and Insurance
465 Real Estate
466 Real Estate Finance
470 Urban Transportation Concepts
481 Management Science
482 Production Management
520 Business Policy
522 Personnel Management
524 Management Simulation
537 International Marketing
538 Marketing Research
539 Marketing Management
550 Financial Analysis
551 Financial Management
552 Commercial Bank Management
555 Securities Analysis and Management
556 Financial Markets

Department of Business Education and Administrative Services

Meada Gibbs, Chairperson

OBJECTIVES

The objectives of the Department of Business Education and Administrative Services are to provide quality instruction for the development of basic and comprehensive business teachers and to prepare students for managerial-level service roles in business, government, and the professions.

DEGREES OFFERED

The Department of Business Education and Administrative Services offers the following degrees:

Administrative Services—B.S.
Business Education—B.S.

GENERAL PROGRAM REQUIREMENTS

Students majoring in Business Education acquire the essential competencies that Business and Office Education teachers need to function in an environment of changing technology. The Business Education program offers two tracks—Basic Business Education and Comprehensive Business Education. The Basic Business Education track emphasizes information systems and accounting. In addition to the basic business concepts, the

Comprehensive Business Education track is designed to prepare students with the methods and skills essential for disseminating knowledge about office procedures, office technology, keyboarding, and office layout/design at the secondary level. Both tracks emphasize professional skills, techniques, and teaching and learning methodologies applicable to Business Education.

The Administrative Services program prepares students for administrative management careers in government, business, and the professions.

Students majoring in programs in the Department of Business Education and Administrative Services must complete 124-128 semester hours consistent with the curriculum guide for the program selected. Business Education and Administrative Services majors must earn a minimum grade of "C" in English 100, 101, Mathematics 111, 112, and B.E. 360.

DEPARTMENTAL REQUIREMENTS

Majors in the Department of Business Education and Administrative Services must earn a minimum grade of "C" in 8 (24 hours) of the 10 (30 hours) courses identified as major program requirements in the applicable University Bulletin for the selected area of study.

The curriculum meets the certification requirements for the State of North Carolina. The Business Education and Administrative Services Department will be guided by the State's certification procedure in force.¹ Each student is required to pass Core Batteries I, II, III, and the Specialty Area Test of the National Teachers Examination for initial certification. Check with your advisor or Chairperson for details.

To be eligible for student teaching in both Comprehensive Business Education and Basic Business Education, the student must have met the following requirements:

1. Senior Standing
2. Completed three-fourths of the number of hours required in basic business and economic courses.

3. Completed three-fourths of the number of hours required in his/her subject matter major.
4. Attained an average of 2.00 or better in all work undertaken in the University, in all professional education courses undertaken, and in all courses undertaken in the subject matter major.

ACCREDITATION

Business Teacher Education Programs are accredited by the National Council for Accreditation of Teacher Education and approved by the State Department of Public Instruction.

CAREER OPPORTUNITIES

Depending on the major selected, graduates of the Department of Business Education and Administrative Services are qualified for career opportunities as business teachers in middle and secondary grades, administrative assistants, and office administrators, and other managerial personnel in business, industry, and the government.

¹ *Business Teacher Education majors must meet the relevant admission, retention, and exit criteria for the Teacher Education Program.*

CURRICULUM GUIDE FOR BUSINESS EDUCATION (BASIC)

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Mathematics 111	4
Natural Science elective ²	4
History 101	3
Business Administration 220	3
	17

<i>Second Semester</i>	Credit
English 101	3
Mathematics 112	4
Natural Science elective ²	4
Humanities 200	3
Business Education 302 ³	2
Physical Education	
Elective	2
	<u>18</u>

Sophomore Year

<i>First Semester</i>	Credit
Economics 300	3
Accounting 221	3
Humanities 201	3
Psychology 320	3
Education 300	2
Business Education 334	3
	<u>17</u>

<i>Second Semester</i>	Credit
Business Education 360	3
Accounting 222	3
Speech 250	3
Economics 301	3
Education 301	2
Business Administration 341	3
	<u>17</u>

Junior Year

<i>First Semester</i>	Credit
Business Education 342	3
Business Administration 422	3
Accounting 446	3
Economics 305	3
Business Education 379	3
Education 400	3
	<u>18</u>

<i>Second Semester</i>	Credit
Business Administration 453	3
Business Administration 481	3
Business Education 670	1
Business Administration 430	3
Business Education 681	3
Business Administration 440	3
	<u>16</u>

Senior Year

<i>First Semester</i>	Credit
Business Education 671	1
Business Administration 461	3
Business Education 575	3
Business Administration 520	3
Business Education 682	3
Electives	3
	<u>16</u>

<i>Second Semester</i>	Credit
Education 624	3
Education 500	3
Education 560	6
	<u>12</u>

² Recommended courses: Biological Science, Physical Science.

³ Students who do not pass the Proficiency Test for Beginning Typewriting should enroll in BE 301, the prerequisite for BE 302.

Major Program Requirements:	Semester Hours
BE 360—Business Communications	3
BE 575—Methods of Teaching Business Subjects	3
BE 681—Coordinating Techniques/Job Analysis	3
BE 682—Administration and Supervision in Business Education	3
AC 446—Managerial Accounting	3
BA 341—Introduction to Management Information Systems	3
BA 422—Introduction to Management	3
BA 430—Marketing	3
BA 453—Business Finance	3
BA 461—Legal Environment of Business	3
	<u>30</u>

CURRICULUM GUIDE FOR BUSINESS EDUCATION (COMPREHENSIVE)

Freshman year

<i>First Semester</i>	Credit
English 100	3
Mathematics 111	4
Natural Science elective ²	3-4
History 101	3
Business Administration 220	3
	<u>16-17</u>

<i>Second Semester</i>	Credit
English 101	3
Mathematics 112	4
Natural Science elective ²	4
Humanities 200	3
Business Education 302 ³	2
Physical Education/Health Education	
Electives	2
	<u>18</u>

Sophomore Year

<i>First Semester</i>	Credit
Economics 300	3
Accounting 221	3
Psychology 320	3
Business Education 334	3
Education 300	2
Humanities 201	3
	<u>17</u>

<i>Second Semester</i>	Credit
Speech 250	3
Accounting 222	3
Business Administration 341	3
Business Education 332 ⁴	3
Education 301	2
Economics 301	3
	<u>17</u>

² Recommended courses: Biological Science, Physical Science 100.

³ Students who do not pass the Proficiency Test for Beginning Typewriting should enroll in BE 301, the prerequisite for BE 302.

⁴ Students who do not pass the Proficiency Test for Shorthand I should enroll in BE 331, the prerequisite for BE 332.

Junior Year		Major Program Requirements:	Semester Hours	Sophomore Year	
<i>First Semester</i>				<i>First Semester</i>	
Business Administration 422	Credit 3	BE 332—Shorthand II	3	Humanities 200	Credit 3
Economics 305	3	BE 342—Business Programming	3	Psychology 320	3
Business Education 379	3	BE 360—Business Communications	3	Accounting 221	3
Business Education 342	3	BE 447—Wood Processing Concepts and Applications	3	Business Education 334	3
Education 400	3	BE 573—Executory Administration	3	Economics 300	3
Business Education 360	3	BE 575—Methods of Teaching Business Subjects	3	Business Administration 341	3
	18	BE 681—Coordinating Techniques/Job Analysis	3		18
<i>Second Semester</i>		BE 682—Administration and Supervision in Business Education	3	<i>Second Semester</i>	
Business Administration 453	Credit 3	BA 341—Introduction to Management Information Systems	3	Humanities 201	Credit 3
Business Administration 481	3	BA 430—Marketing	3	Business Education 342	3
Business Administration 430	3		30	Accounting 222	3
Business Education 447	3			Speech 250	3
Business Education 681	3			Business Education 332 ⁴	3
Business Education 670	1			Economics 301	3
	16				18
Senior Year		CURRICULUM GUIDE FOR ADMINISTRATIVE SERVICES			
<i>First Semester</i>		Freshman Year		Junior Year	
Business Education 573	Credit 3	<i>First Semester</i>		<i>First Semester</i>	
Business Administration 461	3	English 100	Credit 3	Business Administration 453	Credit 3
Business Education 682	3	Mathematics 111	4	Economics 305	3
Business Education 575	3	Natural Science Electives ¹	3-4	Business Education 360	3
Business Administration 520	3	Business Administration 220	3	Business Administration 422	3
Business Education 671	1	Social Science Electives ³	3	Business Education 447	3
	16		16-17		15
<i>Second Semester</i>		<i>Second Semester</i>		<i>Second Semester</i>	
Education 624	Credit 3	English 101	Credit 3	Business Administration 461	Credit 3
Education 500	3	Mathematics 112	4	Economics 310	3
Education 560	6	Natural Science Electives ¹	3-4	Business Administration 420	3
	12	Business Education 302 ²	2	Business Administration 430	3
		Social Science Electives ³	3	Business Administration 440	3
		Physical Education Elective	2		15
			17-18	Senior Year	
				<i>First Semester</i>	
				Business Administration 481	
				Business Education 573	
				Business Education 670, or 671, or 672	
				Business Education 568	
				Economics 415	
				Electives	
				16	
				<i>Second Semester</i>	
				Business Administration 520	
				Business Administration 522	
				Electives (Non-business)	
				12	

¹ *Recommended Courses: Biological Science 100; Physical Science 100; Introduction to Astronomy 101; Survey of Physics 201.*

² *Students who do not pass the Proficiency Test for Beginning Typewriting should enroll in BE 301, the prerequisite for BE 302.*

³ *Recommended Courses: History 100, 101, 215, 216, 310, 311; Geography 200 and 322; Political Science 200; Sociology 100 and 200.*

⁴ *Students who do not pass the Proficiency Test for Shorthand I should enroll in BE 331, the prerequisite for BE 332.*

Major Program Requirements:	Semester Hours
BE 342—Business Programming	3
BE 360—Business Communications	3
BE 447—Word Processing and Concepts and Applications	3
BE 568—Office Automation	3
BE 573—Executory Administration	3
BA 341—Introduction to Management Information Systems	3
BA 422—Introduction to Management	3
BA 522—Personnel Management	3
AC 222—Principles of Accounting	3
EC 305—Elementary Statistics	3
	30

DIRECTORY OF FACULTY AND COURSES

Business Education and Administrative Services Faculty

Sylvia Bemby, B.S., Albany State College; M.S., Indiana University; Ph.D., University of Iowa; Assistant Professor
 Meada Gibbs, B.S., Allen University; M.S., Ph.D., University of Wisconsin at Madison; Associate Professor and Chairperson
 Jack Hulbert, B.S., Paterson State College; M.B.A., Ph.D., Indiana University; Professor
 Virginia Reynolds, B.S.B.A., Roosevelt University; M.A., Ph.D., University of Iowa; Assistant Professor

Doris, Surgeon, B.A., Bennett College; M.Ed., University of North Carolina at Greensboro; Instructor

Courses

301 Beginning Typewriting
 302 Intermediate Typewriting
 331 Gregg Shorthand I
 332 Gregg Shorthand II
 334 Microcomputer Usage in Business
 342 Business Programming
 360 Business Communications
 379 Personal Finance
 447 Word Processing Concepts and Applications
 568 Office Automation
 573 Executory Administration
 575 Methods of Teaching the Business Subjects (Comprehensive & Basic)
 664 Occupational Exploration for Middle Grades
 665 Occupational Exploration in the Middle Grades-Business Education and Office Occupations
 670-672 Directed work Experience
 681 Coordinating Techniques and Job Analysis in Cooperative Occupational Education Programs
 682 Administration and Supervision in Business Education

Department of Economics

OBJECTIVES

The objectives of the Department of Economics are to develop the student's ability to understand and use economic principles and concepts to identify, analyze, and solve problems associated with the economy, and to develop potential for leadership positions in business, education, and the government.

DEGREES OFFERED

Economics—B.S.
 Transportation—B.S.

GENERAL PROGRAM REQUIREMENTS

Two program options are available to majors in Economics: (1) Business Economics and (2) General Economics. The business-oriented option includes the same core courses required of all Business Administration and Accounting majors in the School of Business and Economics. In the general option, the student is allowed 27 hours in free electives in order to develop other areas of interest, such as computer science or preparation for graduate study or law school.

Economics and Transportation majors are required to complete a minimum of 124 hours for a baccalaureate degree consistent with the curriculum guide for the program selected. Also, a minimum grade of "C" must be earned in English 100, English 101, Business Education 360, Mathematics 111, and Mathematics 112.

DEPARTMENTAL REQUIREMENTS

Students majoring in programs in Economics must earn a minimum grade of "C" in all Economics courses listed as Major Program Requirements. Economics 300 and 301 are prerequisite to all courses in Economics.

CAREER OPPORTUNITIES

The Economics major is prepared for careers in government services, business, and industry and is provided with the educational background for graduate study and the study of law. The Transportation major is prepared for careers in carrier and physical distribution management with rail roads, motor lines, water carriers, airlines, other industries and the government.

CURRICULUM GUIDE FOR THE MAJOR IN ECONOMICS (BUSINESS)

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Mathematics 111	4
History 100	3
Biological Science	4
Physical Education	1
Health Education 200	2
	17

<i>Second Semester</i>	Credit
English 101	3
Mathematics 112	4
History 101	3
Physical Science	4
Business Administration 220	3
	17

Sophomore Year

<i>First Semester</i>	Credit
Accounting 221	3
Speech 250	3
Humanities Elective	3
Psychology 320	3
Economics 300	3
Economics 305	3
	18

<i>Second Semester</i>	Credit
Accounting 222	3
Humanities Elective	3
Business Administration 341	3
Economics 301	3
Economics 310	3
	15

Junior Year

<i>First Semester</i>	Credit
Business Administration 430	3
Foreign Language	3
Business Administration 422	3
Economics 410	3
Economics 412	3
	15

<i>Second Semester</i>	Credit
Business Administration 453	3
Foreign Language	3
Economics 415	3
Economics 420	3
Business Education 360	3
	15

Senior Year

<i>First Semester</i>	Credit
Business Administration 481	3
Business Administration 461	3
Economics Elective	3
Electives (non-business and non-economics)	6
	15

<i>Second Semester</i>	Credit
Business Administration 520	3
Economics 525	3
Economics Elective	3
Electives (non-business and non-economics)	6
	15

Major Program Requirements:	Semester Hours
EC 300—Principles of Economics (Micro)	3
EC 301—Principles of Economics (Macro)	3
EC 305—Elementary Statistics	3
EC 310—Advanced Statistics	3
EC 410—Intermediate Economic Theory	3
EC 412—Quantitative Analysis	3
EC 415—Money and Banking	3
EC 420—National Income Analysis	3
EC 525—Economics Seminar	3
BA 341—Introduction to Management Information Systems	3
	30

CURRICULUM GUIDE FOR THE MAJOR IN ECONOMICS (GENERAL)

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Mathematics 111	4
History 100	3
Biological Science	4
Physical Education	1
Health Education 200	2
	17

<i>Second Semester</i>	Credit
English 101	3
Mathematics 112	4
History 101	3
Physical Science	4
Business Administration 220	3
	17

Sophomore Year

<i>First Semester</i>	Credit
Economics 305	3
Humanities 200	3
Economics 300	3
Psychology 320	3
Speech 250	3
	15

<i>Second Semester</i>	Credit
Economics 310	3
Business Administration 341 or Mathematics 240	3
Humanities 201	3
Economics 301	3
Social Science Elective	3
	15

Junior Year

<i>First Semester</i>	Credit
Foreign Language	3
Economics 410	3
Economics 412	3
Economics Electives	3
Social Science or Math Elective	3
	15

<i>Second Semester</i>	Credit
Foreign Language	3
Economics 420	3
Economics Electives	3
Economics 415	3
Elective	3
	15

Senior Year

<i>First Semester</i>	Credit
Electives ¹	15
	15

<i>Second Semester</i>	Credit
Economics 525	3
Electives ¹	12
	15

Major Program Requirements:	Semester Hours	Administration 522; Sociology 302, 501 or 601; and Psychology 445. Two electives (6 hours) must be selected in consultation with the appropriate adviser.	Second Semester	Credit
EC 300—Principles of Economics (Micro)	3		Business Administration 461	3
EC 301—Principles of Economics (Macro)	3		Business Administration 453	3
EC 305—Elementary Statistics	3		Economics 415	3
EC 310—Advanced Statistics	3		Business Education 360	3
EC 410—Intermediate Economic Theory	3		Transportation 450	3
EC 412—Quantitative Analysis	3			15
EC 415—Money and Banking	3			
EC 420—National Income Analysis	3			
EC 525—Economics Seminar	3			
BA 341—Introduction to Information Info Systems or,				
MATH 240—Introduction to the Programming of Digital Computers	3			
	30			

CURRICULUM FOR THE MAJOR IN TRANSPORTATION

Freshman Year

First Semester	Credit
English 100	3
Mathematics 111	4
Biological Science	4
Social Science Elective	3
Health Education 200 or Physical Education	2
	16
Second Semester	Credit
English 101	3
Mathematics 112	4
Physical Science	4
Social Science Elective	3
Business Administration 220	3
	17

Sophomore Year

First Semester	Credit
Economics 300	3
Humanities Electives	3
General Psychology 320	3
Speech 250	3
Accounting 221	3
Economics 305	3
	18
Second Semester	Credit
Economics 301	3
Humanities Electives	3
Accounting 222	3
Economics 310	3
Transportation 360	3
	15

Junior Year

First Semester	Credit
Business Administration 422	3
Business Administration 481	3
Business Administration 341	3
Business Administration 430	3
Economics 425	3
	15

Senior Year

First Semester	Credit
Transportation 650	3
Economics 626	3
Electives (non-business and non-economics)	3
Transportation Electives	6
	15

Second Semester	Credit
Business Administration 520	3
Electives (non-business and non-economics)	6
Transportation Electives	6
	15

Major Program Requirements:	Semester Hours
TRAN 360—Introduction to Transportation	3
TRAN 450—Carrier Management	3
TRAN 650—Transportation Law	3
EC 310—Advanced Statistics	3
EC 425—Economics of Transportation	3
EC 626—Physical Distribution	3
Four courses from TRAN 460, 660, BA 470, BA 610, EC 410, EC 501, EC 599	12
	30

UPS ENDOWED CHAIR

Established to provide faculty support for curriculum and student development; and, to enhance research and other scholarly activities in transportation.

¹ Fifteen (15) semester hours should be taken from the following disciplines: Computer Science, Mathematics, Business Administration, Accounting, Political Science, Agricultural Economics, Sociology, Anthropology, English or Education in consultation with adviser.

MANPOWER CONCENTRATION FOR ECONOMICS MAJORS

The Department of Economics offers a manpower concentration which provides an understanding of manpower planning, manpower program evaluation, and manpower administration. In this concentration, students gain expertise in coping with problems of employment and additional skills for careers in state, city and county government, federal agencies, private industry, as well as community manpower agencies.

Students interested in the manpower concentration should complete the following core courses: Economics 305 or Psychology 322; Economics 602, 603; Business

TRANSPORTATION MINOR

The Department of Economics administers a minor in Transportation which provides an understanding of urban and rural transportation planning with a special emphasis on public transport. In this minor, students are prepared for careers in transportation agencies of federal, state, county and city governments or in related private industry. Any major within the University may complete the requirements of this minor.

Students interested in the transportation minor must successfully complete 18 semester hours from the following courses: Business Administration 470, Economics 425; Twelve (12) hours of electives from Political Science 448; Mechanical Engineering 461 and 462; Architectural Engineering 566 and 567; Electrical Engineering 660; Business Administration 610.

DIRECTORY OF FACULTY AND COURSES

Economics

Abdussalam Addus, B.A., Addis Ababa University; M.S., University of Wisconsin; Ph.D., Pennsylvania State University; Associate Professor
 Abul Azam, B.A., Dacca University (Bangladesh); M.A., Ph.D., Duke University; Assistant Professor
 Julian Benjamin, B.S., New York University; M.S., Ph.D., State University of New York at Buffalo; Associate Professor; UPS Chair
 David Chen, B.S., National Taiwan University; M.S., New Mexico State University; Ph.D., University of Wisconsin; Associate Professor
 Basil Coley, B.S., A&T College; M.S., Pennsylvania State University; Ph.D., University of Illinois; Professor
 Dong Jeong, B.A., Teachers College, Kyung-Pook National University, Korea; M.A., Kyung-Pook National University; M.A., University of Hawaii; Ph.D., Wayne State University; Associate Professor

Anwar Khan, B.A., M.A., University of the Punjab; M.A., Ph.D., University of Wisconsin; Professor
 *Vereda King, B.A., Johnson C. Smith University; M.B.A., North Carolina Central University; Ph.D., Duke University; Assistant Professor
 Lawrence Morse, B.A., Oberlin College; Ph.D., University of Minnesota; Associate Professor
 Kofi Obeng, B.Sc., University of Science & Technology (Kumasi, Ghana); A.M., Ph.D., University of Pennsylvania; Associate Professor
 Tijan M. Sallah, B.S. and B.A., Berea College; M.A., Ph.D., Virginia Polytechnic Institute & State University; Assistant Professor
 Michael Simmons, B.S., Arkansas AM&N; M.A., University of Wisconsin; Ph.D., Washington State University; Assistant Professor

*On leave 88-89

Courses in Economics and Transportation

300 Principles of Economics, Micro
 301 Principles of Economics, Macro
 305 Elementary Statistics
 310 Advanced Statistics
 401 Public Finance
 405 History of Economic Thought
 410 Intermediate Microeconomic Theory
 412 Quantitative Analysis
 415 Money and Banking
 420 National Income Analysis
 425 Economics of Transportation
 430 Computer Analysis of Business and Economic Data
 501 Labor Problems
 505 International Economic Relations
 510 Business Cycles
 512 Introduction to Econometrics
 515 Comparative Economic Systems
 520 Economic Development
 525 Economics Seminar
 599 Independent Study
 601 Economic Understanding
 602 Manpower Problems and Prospects
 603 Manpower Planning
 604 Economic Evaluation Methods
 610 Consumer Economics
 615 Economic, Political and Social Aspects of the Black Experience

626 Physical Distribution
 690 Special Topics in Economics
 701 Labor and Industrial Relations
 705 Government Economic Problems
 710 Economic Development and Resource Use
 720 Development of Economic Systems
 360 Introduction to Transportation
 450 Carrier Management
 460 Traffic Management
 650 Transportation Law
 660 National Transportation Policy

TRANSPORTATION INSTITUTE

The Transportation Institute draws faculty, staff members and students from a number of different departments to create an interdisciplinary unit that conducts research, public service and training programs in the field of transportation. It also serves as a resource for planners, social scientists, public officials, and community groups in helping them solve transportation problems.

The Research Program covers a wide range of areas, from investigating transportation needs of the poor to analyzing transportation financing. The Institute has achieved a national reputation for its funded research in small city and rural transportation.

Students play an important role in each of the research projects. Under the guidance of the faculty, student research assistants help in developing and conducting funded projects awarded to the Transportation Institute. The Institute makes substantial financial awards to students who are awarded research assistantships.

The Institute is a regional center which offers seminars, workshops, and short courses designed to provide instruction in current techniques and transportation concepts. These programs are designed for individuals outside the University who have an interest in transportation. In addition they may use the extensive resource collection in transportation which is housed in the Transportation Institute facilities, located in Merrick Hall.

SCHOOL OF EDUCATION

Albert L. Walker, Dean
Dorothy Prince Barnett, Assistant
Dean and Director of Teacher
Education

The School of Education provides curricula for students to prepare for teaching careers in the elementary and secondary schools of the state and for other professional careers in industry and government. The programs of study are planned to enable students to attain competence in both specialized and general areas of Education.

The School of Education includes the following departments: Curriculum and Instruction; Educational Leadership and Policy; Human Development and Services; and Health, Physical Education and Recreation.

All professional teacher education programs are administered and supervised by the School of Education. The Schools of Education and Graduate Studies cooperate with the supervision of graduate teacher education programs, especially as they relate to teacher certification. Moreover, the School of Education serves as the central agency for administering all teacher education programs for undergraduates and the supervision of certification for all education majors at all levels.

The School of Education offers programs leading to the Bachelor of Science degree in Health and Physical Education, Early Childhood Education and Special Education.

In addition to the aforementioned programs, upon the satisfactory completion of an undergraduate program offered by other schools and departments in cooperation with the School of Education, the student is eligible to receive the degree of Bachelor of Science in one of the following areas: Agricultural Education; Art Education; Biology Education; Business Education; Chemistry Education; English Education; French Education; History Education; Home Economics Education; Mathematics Education;

Music Education; Physics Education; Social Studies Education; Speech and Theatre Education; Industrial Arts Education; Industrial Technology; Safety & Driver Education; and Vocational Industrial Education.

General School Goals

1. To offer multicultural programs for students which promote the development of needed occupational and professional skills, including special instruction in career education.
2. To provide opportunities for program enrichment for faculty, students and the community.
3. To continue to develop and improve ways and means for the improvement of all education programs and services, including student academic advisement.
4. To continually encourage faculty and student participation in curriculum reform in each academic department.
5. To continually maintain full accreditation of all programs on the state, regional, and national levels which are administered by the School of Education.
6. To continue to improve the quality of graduate and undergraduate instruction as measured by grade point averages and other measurable performance competencies.
7. To continue to encourage and promote faculty involvement and active participation in research and community affairs.
8. To continue to develop and improve ways and means to evaluate program effectiveness in the School of Education.
9. To upgrade physical facilities and equipment needed in the School of Education to meet optimal operational levels.

THE TEACHER EDUCATION PROGRAM

The Teacher Education Program was accredited initially in 1976 by the National Council for the Accreditation of Teacher Education. This national accreditation was

reaffirmed in 1986 until 1991.

In 1978, the North Carolina Board of Education and the Board of Governors of the University of North Carolina, adopted the "Quality Assurance Program" to chart a new course toward "a systematic, continuous and extended approach to quality assurance" in teacher education and Certification in North Carolina. The program is based on demonstrated performance as a basis for certification, improved teacher education program approval procedures and shared responsibility among colleges, universities and local school systems for the preparation and early performance of competent professionals to serve children in schools across the state.

In an effort to begin the implementation of the Quality Assurance Program, a Resolution was adopted by the State Board of Education on March 2, 1983 and endorsed by the Board of Governors on March 11, 1983. The Teacher Education Program is implementing the mandates of the Quality Assurance Program.

The program of teacher education seeks to improve the quality of education available to the youth of North Carolina through improved preparation of teachers and other school personnel including administrators, guidance counselors and instructional supervisors. To that end, it offers both undergraduate and graduate programs of professional study which represent a continuum with sequential general goals. The program seeks, therefore, to realize these goals:

1. to prepare persons to take their places as competent members of the profession of education; and
2. to provide opportunities for students who wish to pursue graduate studies in education and advanced study for school personnel already established in education.

In order to carry out general goal "number one" of the Teacher Education Program as listed above, these objectives have been established:

1. Plan experiences for students in teacher education which will include the development of persons as individuals as well as specialists in a chosen academic area.
2. Plan multicultural learning environments conducive to appropriate stimulation for developing needed competencies in the following areas:
 - a. personal development
 - b. social development
 - c. professional development
 - d. citizenship maturity
3. Provide the highest level of instruction by way of well-qualified teaching and research personnel who can provide integrated experiences for teacher education students, which will make it possible for them to gain personal, social and academic competencies in the practice of the education profession.
4. Design an organizational structure to delineate and describe those competencies which will assure for teacher education students a quality experience specifically related to the vocational specialty that they will be expected to practice.
5. Plan all program development, evaluation, and supervision so that experiences gained are clearly oriented to the preservice dimension of the Teacher Education Program.

As the teacher education unit observes general goal "number two," the following objectives have been established:

1. Plan multicultural programs for graduate level students which will involve competencies already developed and which are being practiced, and infuse additional high level experiences that will give definite meaning to the competencies being sought. A sequential approach in curriculum development is observed.
2. Provide a learning environment which will stimulate in advance students the desire to delineate and articulate those competencies in their respective specialties that will insure

for them a high level of performance in the practice of their chosen vocation.

3. Emphasize those competencies which are necessary for all advanced students in education. Such competencies allow advanced students to have extensive and intensive experiences in research.
4. Plan and assess measurable competencies of advanced students which will permit these students to attain levels of leadership commensurate with graduate level expectations.

The Office of the University Registrar and the Director of Teacher Education are the central agencies vested with the authority and responsibility to recommend to the State Department of Public Instruction, students who are applying for certification in the following fields:

1. Agricultural Education
2. Art Education
3. Biology Education
4. Business Education
5. Chemistry Education
6. Early Childhood Education
7. English Education
8. French Education
9. Physical Education
10. History Education
11. Home Economics Education
12. Industrial Arts Education
13. Mathematics Education
14. Music Education
15. Physics Education
16. Safety and Driver Education
17. School Social Worker
18. Social Studies Education
19. Special Education
20. Speech and Theatre Education
21. Vocational Industrial Education

In recognition of this function, the approval or endorsement of the department providing courses in the subject matter areas in which the candidate is to be certified must be secured prior to the approval or endorsement of the Director. The University reserves the right to refuse to recommend any applicants for certificates when they are deficient in mental or physical health, scholarship, character, or other qualifications deemed necessary for success in the profession of education.

Two program changes effective Fall Semester 1985 were the addition of the undergraduate program in special education and the initiation of the Teacher Education Cluster for Excellence (TECEX). TECEX specifically addresses the development of general education competencies through a system of grouping. The project is a joint endeavor of the College of Arts and Sciences and the School of Education.

The program in teacher education is divided into three separate but interrelated phases: (1) general education; (2) subject-matter specialization; and (3) professional education.

General Education

The general education phase of the Teacher Education Program functions to provide experience and learning which meet the fundamental needs of all teachers as persons, both in the role of teacher and citizen in a democracy. General education provides for the student the understanding, the knowledge, the appreciation, and the sensitivity attainable through the study of a broad range of materials and concepts ranging across the humanities, the arts, the social sciences, the natural sciences and mathematics. It provides a broad understanding of the cultural heritage and of the physical and social environments. General Education is also an essential foundation for the teaching specialty and professional education.

All teacher education students are required to complete with an overall "C" average or better, (2.50 for entering Freshman, Fall 1988), the following courses or their equivalents in General Education:

English 100, 101, Ideas and Their Expressions I, II
 Mathematics 101, 102, Fundamentals of Algebra and Trigonometry I, II or Mathematics III College Algebra and Trigonometry
 Speech 250, Speech Fundamentals
 Biology 100, Biological Science or Chemistry 100, 110, Physical Sciences or other natural sciences
 Psychology 320, General Psychology

History 100, 101, History of World Civilization I, II or History 204, 205, United States History
 Anthropology, Political Sciences, Economics or Geography
 Humanities 200, 201, Survey of Humanities I, II or Humanities 203, Humanities Perspectives of the South, English 210, Introduction to Literary Studies
 Physical Education 101, 102, Fundamentals of Physical Education
 Health Education 200, Personal Hygiene

Subject-Matter Specialization

Experiences of students in the subject-matter specialization area are designed to develop a high level of subject competence in those who later will seek certification in their respective specialties. Subject-matter specialization provides opportunities for the student to understand the theoretical basis upon which subject content is developed and organized. It also provides the student an opportunity to accumulate and to understand a vast body of facts which comprises one's selected discipline. The function of knowledge in the development of mature scholarship is emphasized in this segment of the prospective teacher's experiences also.

Professional Education

The professional education phase of the Teacher Education Program is designed to induct the prospective teacher into the profession of education. During this segment of the student's experience he develops definable competence in the following:

1. Understanding the school as a social system with structures, functions, and special goals.
2. Understanding the learner (student) as a dynamic and unique personality capable of wide variation in behavioral adjustment.
3. Understanding the functional nature of human learning, how to diagnose and assess it, and how it takes place in individual and group settings, especially in organized school environments.

4. Understanding what resources facilitate learning and how these resources may be effectively used in a learning-teaching environment.
5. Understanding the processes at work between the school and the wider society which have influenced the learning-teaching situation, historically.
6. Understanding effective techniques and strategies for enhancing learning among students who have a wide range of needs, abilities, and interests.
7. Understanding the education profession as a medium through which continuous individual development of the teacher is paramount in order to maintain accountability to himself, to the students he will teach, to the profession proper, and to society in general.

TEACHER EDUCATION ADMISSION AND RETENTION STANDARDS, INCLUDING CERTIFICATION PROCEDURES

Each current and prospective teacher education student will be informed, on an individual basis, of the probability that he or she might successfully complete the requirements for initial certification as a teacher in North Carolina. This information will be part of the regular advising and counseling program of the university and will include a discussion of the SAT score, grade point average, and other predictive measures.

Admission

The Teacher Education Council makes all policies governing the entire Teacher Education Program; therefore, admission, retention and exit procedures are reviewed by the Council.

Formal admission to the Teacher Education Program normally begins at the completion of the sophomore year and the general studies requirements, although teaching majors are identified at admission to the University.

Students must meet each of the following criteria for formal admission to the Program.

1. Completed application approved by academic departments of certification areas
2. Minimum cumulative 2.50 GPA (on a 4.00) scale for entering freshmen, Fall 1988
3. Evidence of good health
4. Scores on file from the following standardized tests:
 —Scholastic Aptitude Test
 —16 Personality Factors Interest Inventory
 —Reading Test
 —Minimum Score of 636 on NTE
 Core Battery I: Communication Skills
 —Minimum Score of 631 on NTE
 Core Battery II: General Knowledge Test
5. Interview by Teacher Education Panel
6. Writing Sample approved by English Department faculty

Departments clear applicants on items 1-4 before applications are approved and submitted to the Office of the Director of Teacher Education. The Director of Teacher Education will notify the applicants in writing of admission or rejection.

ONLY FORMALLY ADMITTED STUDENTS MAY ENROLL IN advanced courses in the Professional Education Sequence.

Transfer students interested in applying must meet the same initial requirements for entry.

Retention

To remain in the Teacher Education Program, students must maintain a minimum academic average of 2.00 in their subject area and in professional education. Students must meet with their advisor a minimum of twice per term to discuss progress in the program. If students fail to maintain academic requirements or for other reasons, they will be notified of their probationary status or dropped from the program by their respective academic departments, deans, and the Director of Teacher Education.

Readmission to Teacher Education Program

Once a student has been dropped from the Teacher Education Program for any reason, the following

steps must be taken before a student will be readmitted to the Teacher Education Program:

1. The student must file a formal application for readmittance to the Teacher Education Program with the Director of Teacher Education.
2. The Director of Teacher Education must bring the application of the student along with the student's complete profile before the Teacher Education Council for action.
3. The Director of Teacher Education will formally notify, in writing, the student, Department Chairperson, Dean of the School involved and the Chief Officer of Academic Affairs of the action of the Teacher Education Council with reference to the student's application for readmission to the Teacher Education Program.

Transfer to the Teacher Education Program

Transfer policies refer to the students who start their college programs in an academic area (such as mathematics or chemistry) and decide to become teachers late in their college careers. The following requirements are necessary for admittance to the Teacher Education Program under these conditions:

1. The student must have satisfied the general education requirements.
2. The student must have a 2.50 grade point average for entering Freshmen, Fall 1988, in the student's academic work and the general education program.
3. The student must apply formally to be admitted to the Teacher Education Program. Application will be made to the

Chairperson of the Department in which the student plans to major.

4. The student must meet the same criteria as are recommended for other students in suggested policies governing admission to the Teacher Education Program.
5. The Chairperson of the Academic Department has the responsibility of enrolling the student in the Teacher Education Program after the student has met all requirements.

Certification

After completing the teacher education sequence of experiences, the student must apply for state certification by requesting a certification application form from the Office of the Director of Teacher Education. After completing the application and obtaining the appropriate sig-



natures, the student must return the application form to the Office of the Director of Teacher Education, which will send the completed application form to the Office of Registration and Records. This office will attach a copy of the student's official transcript to the application form and forward it to the State Department of Public Instruction in Raleigh, North Carolina.

The student is required to take the National Teacher Examinations. The student must score at a level that is satisfactory to the State Board of Education.

A minimum score of 644 on the Professional Knowledge Exam and a passing score on the area examination are required. Candidates for initial certification must also provide SAT scores with their application for initial certification.

Second Major Requirement

Effective fall 1988, freshmen students in selected teacher education majors are required to complete a second major or complete a major in a basic academic discipline as well as the necessary professional training. The planning of the academic program will be under the guidance of the appropriate advisor.

The following procedure leading to institutional recommendation for certification is to be followed by one who graduated from an accredited college and did not complete a program leading to teaching certification or converts to a new certification area:

1. The official copy(ies) of the candidate's transcript and other appropriate credentials must be filed with the academic department of the area in which the candidate is seeking certification.
2. The candidate's credentials must be evaluated by the academic department of the certification area. Four copies of the department's evaluation must be prepared and transmitted as follows:
 - one copy to the candidate
 - one copy to the Director of Teacher Education
 - one copy to the Dean of the School/College in which the academic department is located

—one copy for the academic department

3. Original copies of the candidate's credentials must be filed after evaluation by the academic department with the Office of Teacher Education.
4. The candidate must satisfy the institutional assessment and meet the requirements of the evaluation.
5. The candidate seeking initial certification in a teaching field must apply for admission to the Teacher Education Program and pass NTE Core Battery Test III, Professional Knowledge. Core Battery Tests I and II may be required, if warranted. The requirement must be recommended by the Chairperson of the department of the candidate's certification area. GRE requirements may be used by students of graduate standing.
6. The candidate must complete a minimum of 12 semester hours at A&T State University before the University recommends the candidate for certification.
7. The candidate must have at least three advisement conferences with his/her faculty advisor during the program to include the point of admission and point of completion. These conferences must be documented consistent with SDPI Form IHE-01a.
8. When the program is completed, the candidate will initiate his application for certification in the Office of Teacher Education. The Office of Teacher Education will be responsible for the campus processing of the certification application.

Department of Educational Leadership and Policy

Henry T. Cameron,
Chairperson

OBJECTIVES

The objectives of the Department of Educational Leadership and Policy are to offer graduate level programs of preparation in Administration, Adult Education and Supervision. The Master's degree programs in Administration and Supervision are teacher education programs and they are consistent with the state adopted competency-based guidelines. These programs of study lead to North Carolina Certification at the Administrator I and Curriculum Instructional-Specialist I levels. The Master of Science in the Adult Education program is not considered as a teacher education program but it is developed and implemented on competency-based guidelines. The Department also offers programs of certification in Administration and Supervision for those students who already hold a Master's degree in education with certification in other professional areas. The graduate programs in the department are designed to prepare students for positions in public school administration; adult education, supervision of instruction in public schools and teaching or administration primarily at the Community College/Technical Institute levels.

DEGREES OFFERED

Education—Administration—M.S.
Education—Adult Education—M.S.
Education—Supervision—M.S.
Certification in Administration—Certificate—Administrator I
Certification in Supervision (Curriculum Instructional-Specialist I)

GENERAL PROGRAM REQUIREMENTS

Requirements for admission to the degree programs in the Department of Educational Leadership and Policy are as follows:

1. Educational Administration and Supervision
 - a. Baccalaureate degree from an accredited undergraduate institution
 - b. Class "A" Certificate in area of concentration.
 - c. Satisfactory completion of all graduate school requirements for admission to candidacy for a degree program
2. Adult Education
The admission of students to the graduate program in Adult Education is based upon the general admission requirements of the Graduate School.
3. Under policies of the Graduate School, candidacy for a degree requires the following:
 - a. The Qualifying Essay
 - b. The Graduate Record Examination (Aptitude and Advanced Test in Education)

DEPARTMENTAL REQUIREMENTS

The major in both Administration and Supervision (Curriculum-Instructional Specialist) must complete a minimum thirty-one semester hours of University work for the graduate degree and must maintain an overall grade point average of 3.0.

Students who hold the Master's degree and seek Certification must meet all state requirements for Certification, complete a minimum of twelve (12) hours within the department, and successfully complete the department's exit examination.

Application for the exit examination may be obtained from the Office of Educational Leadership and Policy.

Before enrolling in a degree or certification program, each student is required to meet with the departmental chairperson and to be assigned a faculty advisor who will be responsible for approval of the

student's program of study. The student who holds a Master's degree and seeks Certification only must submit a transcript of his/her graduate studies to the departmental chairperson prior to, or at the time of, the initial conference.

The major in Adult Education is required to complete a minimum of 30 graduate semester hours with thesis or 33 hours without the thesis and must maintain an overall grade point average of 3.0. At least 50% of the courses counted toward the graduate degree must be of courses offered to graduate students only, i.e., courses numbered 700-799. Each graduate student must satisfactorily complete an adult teaching practicum under supervision.

CAREER OPPORTUNITIES

Graduate degree and certification programs qualify the student for the principalship and/or supervisory positions at the elementary and secondary school levels. The program in postsecondary education is designed to meet the needs of administrative, supervisory and teaching personnel at the community college and technical institute levels.

Students who earn the degree in Adult Education may look forward to careers in such endeavors as Agricultural Extension, Adult Basic Education, Community College Education, Religious Education, Law Enforcement, Continuing Education, Nursing, and Community School Education.

CURRICULUM GUIDE

Administration: 31 Semester Hours Required

This program is designed for students who are interested in qualifying for State Certification as Administrator I (the principal's certification). Completion of this program does not qualify one for the graduate teaching certificate.

Students pursuing certification, but not the Master's degree are required to complete at least 12 semester hours in the department.

Education 761, Organization and Administration, is a prerequisite for all other professional courses in the specific areas of organization, administration, curriculum, instruc-

tion and supervision (item 1b and 1c in the requirements outlined below).

1. Courses

- a. Foundations in Education—3 hours
320-726 Educational Psychology or
311-701 Philosophy of Education
 - b. Organization and Administration—6 hours selected from:
312-760 The Junior High School
312-761 Organization and Administration of Schools
312-762 The Principalship
 - c. Curriculum, Instruction and Supervision—6 hours selected from:
310-720 Curriculum Development
312-755 Supervision of Instruction
312-756 Supervision of Student Teachers
 - d. Cognate Disciplines—6 hours selected from:
Economics
Political Science
Sociology
Anthropology
 - e. Internship—Administrative Field Experience—3 hours
312-769 Problems in Educational Administration
 - f. Six (6) hours electives
- ### 2. Other Requirements
- a. GRE (aptitude and advanced tests in education)
 - b. Masters Comprehensive in Education and Administration. Persons seeking certification only will take the administration comprehensive.
 - c. Overall grade point average of 3.0 for all graduate courses

Curriculum Instructional Specialist:

31-34 Semester Hours Required

For the Curriculum Instructional Specialist's I (Master's degree) Certificate, the State of North Carolina requires five (5) years of teaching and/or supervisory or administrative experience within the past eight years. A student will not be recommended for the North Carolina Instructional Specialist's Certificate

without the minimum five (5) years of experience specified above. In order for a student to be recommended for certification as Curriculum Instructional Specialist I, he/she must have or be eligible for a G Certificate in a content area.

- Requirements for Unconditional Admission:
1. Baccalaureate degree from an accredited institution
 2. Overall grade point average of 2.6 in undergraduate studies
 3. Class "A" Certificate (or qualification for such certificate)
 4. Failure to meet any of these criteria may cause rejection of the applicant or may require additional undergraduate work to satisfy the requirements.

- Courses in Education and Psychology—15 semester hours
1. Supervision—3 hours required
 - 312-755 Supervision of Instruction
 - 312-757 Problems in Supervision in the Elementary School
 - 312-758 Problems in High School Supervision
 2. Curriculum—3 hours required
 - 310-720 Curriculum Development
 - 310-721 Curriculum in the Elementary School
 - 310-722 Curriculum in the Secondary School
 3. The Nature of Learning and the Learning Process—3 hours required
 - 320-635 Educational Psychology and Learning
 - 320-726 Educational Psychology
 - 311-727 Child Growth and Development
 4. Organization and Administration—4 hours required
 - 312-761 Organization and Administration of Schools (Prerequisite)
 5. 312-770 Problems in Educ. Supv. (Internship)—3 hours required
 6. Educational Research—3 hours required
 - 312-790 Seminar in Educational Problems
 Required courses in subject matter to qualify for issuance of the graduate teacher's certificate—early childhood or

intermediate, or secondary—12-18 semester hours.
 Electives—If 12 semester credit hours are used to satisfy the above, 3 hours may be used as electives to meet the particular needs of the student.

- Other Requirements
1. Qualifying Examination
 2. Graduate Record Examination
 3. Master's Comprehensive Examination in Education
 4. Master's Comprehensive Examination in Supervision. Persons seeking certification only will take the supervision comprehensive.
 5. Overall grade point average of 3.0 for all graduate courses

Total number of hours required 31-34 (31 for those completing work for the supervisor's program at the Early Childhood Education level and the Intermediate Education level).

Curriculum for Major in Adult Education

Course	Description	Credit
312-650	Special Problems in Adult Education	3
312-651	Introduction to Adult Education	3
312-652	Methods in Adult Education	3
312-653	Adult Development and Learning	3
312-654	Gerontology	3
312-690	The Community College and Post Secondary Education	3
312-700	History and Philosophy of Adult/Continuing Education	3
312-701	Organization, Administration and Supervision of Adult Education Programs	3
312-702	Practicum in Teaching Adults	3
312-703	Seminar on Contemporary Issues in Adult/Continuing Education	3
312-704	Independent Study	2
312-705	Thesis Research (Optional)	3
311-641	Teaching the Culturally Disadvantaged Learner	3
311-710	Methods and Techniques of Research	3

311-790	Seminar in Educational Problems	3
311-611	Utilization of Educational Media	3
110-601	Adult Education in Occupational Education	3
235-669	Small Groups	3

ACCREDITATION

The graduate degree programs in administration and supervision are approved by the North Carolina State Department of Public Instruction, National Council for Accreditation of Teacher Education (NCATE) and the Commission on College of the Southern Association of Colleges and Schools.

COURSE OFFERINGS

312-650	Special Problems in Adult Education
312-651	Introduction to Adult Education
312-652	Methods in Adult Education
312-653	Adult Development and Learning
312-654	Gerontology
312-688	School Law and the Teacher
312-689	Contemporary Issues in Administration
312-690	The Community College and Post Secondary Education
312-700	History and Philosophy of Adult/Continuing Education
312-701	Organization, Administration and Supervision of Adult Education Programs
312-702	Practicum in Teaching Adults
312-703	Seminar on Contemporary Issues in Adult/Continuing Education
312-704	Independent Study
312-705	Thesis Research (Optional)
312-755	Supervision of Instruction
312-756	Supervision of Student Teachers
312-757	Problems in Supervision in the Elementary School
312-758	Problems in High School Supervision
312-760	The Junior High School
312-761	Organization and Administration of Schools
312-762	The Principalship
312-763	Public School Administration
312-764	Pupil Personnel Administration

312-765 School Community Relations and Communication
 312-766 School Planning
 312-767 Public School Finance
 312-768 Principles of School Law
 312-769 Problems in Educational Administration (Internship)
 312-770 Problems in Educational Supervision (Internship)
 312-771 Program Development: Community Education
 312-772 Program Management: Community Education
 312-776 Principles of College Teaching
 312-777 Seminar in Postsecondary Education
 312-778 Student Personnel Services
 312-779 Technical Education in Community Junior Colleges
 312-781 Internship (Community College/Technical Institute)
 312-785-A Independent Readings in Education I
 312-786-A Independent Readings in Education II
 312-787-A Independent Readings in Education III
 312-790-A Seminar in Education Problems
 312-791-A Thesis Research
 312-792 Advanced Seminar and Internship in Education Administration

FACULTY

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 Ronald O. Smith, B.S., Florida A&M University; M.A., Northeastern Illinois University; Ph.D., Purdue University; Associate Professor
 Albert L. Walker, B.S., Lincoln University; M.A., Bradley University; Ed.D., Indiana University; Professor and Dean, School of Education
 Sullivan Welborne, B.S., M.S., North Carolina A&T State University; Ed.D., The University of North Carolina at Greensboro; Assistant Professor

Department of Curriculum and Instruction

Charles L. Hayes
 Chairperson

OBJECTIVES

The Department of Curriculum and Instruction provides the professional studies component for the preparation of teachers and other school personnel at the bachelor's degree and master's degree levels. The department cooperates with the various academic departments of the University for teacher education preparation. In addition, the department offers a concentration in Urban Education and a component in Career Education.

DEGREES OFFERED

Early Childhood Education—B.S.
 *Early Childhood Education—M.S.
 *Elementary Education (General)—M.S.
 *Intermediate Education—M.S.
 *Reading Education—M.S.
 Reading Education—State Certification
 *Education, Educational Media—M.S.
 *Education, Educational Media—Sixth-Year Program

**See the Bulletin of the Graduate School*

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree program in Elementary Education—K-4 is based upon the general admission requirements of the University.

To be admitted to the Teacher Education Program a student must satisfy the requirements as stated in the University Bulletin under Teacher Education Admittance and Retention Standards.

PROFESSIONAL STUDIES COMPONENT

The professional studies component of the Teacher Education Program is designed to provide for the development of those competencies essential to the professional role of a teacher or special service professional.

Undergraduate. Approximately eighteen percent of the undergraduate curriculum constitutes the professional studies component. Specific teacher competencies are developed through the provision of:

1. A study of the processes and theories of human growth development, learning and teaching with field experiences.

2. A humanistic study of the problems, issues and trends in education within a historical, philosophical, sociological, economic and governmental framework.
3. Instruction and experiences in creating and using learning environments.
4. A study of the process and techniques for analyzing and evaluating the teaching learning environment.
5. Experiences for the acquisition of knowledge, attitudes, and skills for positive human and social relationship.

Graduate. At the master's degree level, approximately 20 to 40 percent of the graduate program is required for professional studies. Candidates for degrees in elementary education (Early Childhood Education, Intermediate Education) must complete a minimum of 12 semester hours and candidates in secondary education must complete a minimum of six semester hours in professional studies. Specific professional studies courses are listed in the *Graduate School Bulletin*.

CAREER EDUCATION

Career education is conceptualized as a structured orientation and preparation in career development as an integral part of academic experiences. It should prepare every student, from kindergarten through graduate school, to determine and prepare for a rewarding occupation. Up to 12 semester hours of courses offered by the department may be elected by students to enhance their preparation as teachers or as individuals.

EARLY CHILDHOOD EDUCATION OBJECTIVE

The Early Childhood Education program is designed to develop professional competencies and understanding needed to teach in kindergarten through grade three.

At the graduate level, the department offers curricula leading to the Master of Science degree in Early Childhood Education. The program aims to develop prospective teachers who will realize the importance of change, and the need for continued learning. All persons who guide the development of young children need an understanding of the child, his world, and the numerous forces that influence him, as well as the basic principles on which decisions regarding instruction and practice are based.

DEPARTMENTAL REQUIREMENTS

Early Childhood Education—The major in early childhood education must complete a minimum 124 semester hours of University courses. However, if a major elects to take Mathematics 101 and 102 instead of Mathematics 111, s/he will complete 126 semester hours for graduation. Eighteen semester hours of suggested and/or free electives are included in the curriculum.

A minimum grade of "C" must be achieved in all required courses.

State Certification in Reading—Students desiring to obtain certification in reading at the undergraduate level must complete 18 specified semester hours in reading or reading related courses.

CAREER OPPORTUNITIES

In addition to preparing teachers for K-4, a degree in this field also provides for career opportunities in allied fields such as health, social service, child/family relations, communication arts and other diversified areas.

CURRICULUM GUIDE FOR THE MAJOR

Bachelor of Science

Freshman Year

<i>First Semester</i>	Credit
English 100	3
History 204	3
Education 100	1
Chemistry 100, 110	4
Health Education 200	2
Physical Education 101	1
Electives	1
	<u>15</u>

<i>Second Semester</i>	Credit
English 101	3
History 205	3
Mathematics 111 or	4
Mathematics 101 and Math 102	6
Political Science 200 or 210	3
Physical Education 102	1
Geography 210, 200, or 201	3
	<u>17 or 19</u>

Sophomore Year

<i>First Semester</i>	Credit
Psychology 320	3
Child Development 311	3
Zoology 160 or Bio. Sc. 100	4
Humanities 200	3
Education 300	2
Electives	3
	<u>18</u>

<i>Second Semester</i>	Credit
Speech 250	2
Zoology 461	4
Anthropology 200	3
Humanities 201	3
Education 301	2
Electives	3
	<u>17</u>

Junior Year

<i>First Semester</i>	Credit
Education 451	2
Music 609	3
Education 660	3
Physical Education 462	2
English 626 or	
English 220 or	
English 430	3
Education 400	3
	<u>16</u>

<i>Second Semester</i>	Credit
Media Education 602	3
Art 600	3
Education 315	3
Education 436	3
Education 519	3
Electives	2
	<hr/> 17

Senior Year

<i>First Semester</i>	Credit
Education 635	3
Food and Nutrition 632	3
Electives	6
	<hr/> 12

<i>Second Semester</i>	Credit
Education 556	3
Education 557	3
Education 558	6
	<hr/> 12

ACCREDITATION

All Teacher Education Programs are accredited by the National Council for Accreditation of Teacher Education and approved by the North Carolina State Department of Public Instruction.

ELEMENTARY EDUCATION AND READING

OBJECTIVE

At the graduate level, the department offers curricula leading to the Master of Science degree Intermediate Education, Elementary Education (General) and Reading. The program aims to develop prospective teachers who will realize the importance of change, and the need for continued learning. All persons who guide the development of young children need an understanding of the child, his world, and the numerous forces that influence him, as well as the basic principles on which decisions regarding instruction and practice are based.

The graduate program in reading prepares teachers of reading for reading education at all levels, K-12.

EDUCATIONAL MEDIA

OBJECTIVES

The Program in Educational Media provides an integrated curriculum of audio-visual education, library science, and instructional television in the preparation of Media Coordinators and allied personnel to serve learning needs and instructional programs in school media centers, junior and senior college learning resources complexes, business, industry, and health service agencies.

Sixth-Year Program—Certificate of Advanced Studies in Educational Media

The sixth-year program is designed to allow for flexibility leading toward the appropriate specialization—*The Instructional Developer Specialist*—for the media generalist or allied professional.

GENERAL PROGRAM REQUIREMENTS

Admission to the Graduate School of the University is prerequisite to admission to the Department as a Media Major.

DEPARTMENTAL REQUIREMENTS

Media Major—The major in Educational Media must complete a minimum of 30 semester hours. Eighteen to twenty-one of these hours are to be completed in Educational Media. Additionally, majors seeking the Graduate Certificate approved by the North Carolina State Department of Public Instruction are to select twelve hours of course work at the 700 level in the areas of: behavioral and humanities studies, relevant theory, and research. All majors complete the 700 level Internship and Seminar in Educational Media. While 30 semester hours are required to complete the Program, students are encouraged to strengthen the professional preparation through the selection of appropriate electives in Media.

Media Minor—(Associate Media Coordinator) The Associate Media Coordinator credentials approved by the State Department of Public Instruction will terminate in 1986. Students enrolled in this phase of the Program may utilize these courses as the Media Minor. The Associate Media requirements include completion of 12-15 hours in media and 3-6 hours in relevant theory and behavioral and humanities studies. The Media Minor is required to complete the Media courses only.

Media Electives—Students preparing for careers in teaching, supervision, administration and technical fields will find media courses especially helpful in aiding in program design, development and communication.

CAREER OPPORTUNITIES

The media program at North Carolina A. and T. provides a variety of activities in preparing professional media personnel for positions in a myriad of agencies and services. Students have the opportunity to meet in-service media specialists who speak at Media Seminars and share experiences and prospects for employment. Professional workshops that bring new ideas, technology, and personalities to the campus support the instructional program and enhance the student's potentials for employment.

Over 1,600 public schools in North Carolina require full-time media personnel. Health service agencies, public communication agencies, personal training programs, junior and senior colleges and universities are among the many potential employers of well-prepared media specialists.

Suggested Curriculum for Media Major (Media Coordinator)

One Year Curriculum

Fall

611 Utilization of Educational Media	(3)
603 Production of Instructional Materials	(3)
601 Reference Materials and Methods	(3)

* Media elective optional 9

<i>Spring</i>		
600 Organization of Media Collections	(3)	
604 Administration of Educational Media	(3)	
614 Book Selection and Related Materials for Young People	(3)	
or		
613 Developmental Media for Children	(3)	
* Media elective optional	9	

<i>Summer</i>		
I		
**701 Philosophy of Education	(3)	
*** Cognate Course	(3)	
	6	
II		
**755 Supervision of Instruction	(3)	
708 Educational Media Internship and Seminar	(3)	
	6	

* Media elective option. It is recommended that Media Majors elect courses in the area of instructional development to support the media preparation.

** Courses to satisfy behavioral and humanities studies may be taken from a range of offerings.

*** The cognate course may be selected from a discipline relevant to the student's needs and interests.

PROFESSIONAL STUDIES COMPONENT FOR SECONDARY AND SPECIAL AREAS

Sophomore Year		
<i>Fall Semester</i>		
311 300	Credit	2
Psych. 320		3
		5
<i>Spring Semester</i>		
311 301	Credit	2
		2
Junior Year		
<i>Fall Semester</i>		
311 400	Credit	3
		3
<i>Spring Semester</i>		
311 336	Credit	3
		3

Senior Year		
<i>Spring Semester</i>		
311 500	Credit	3
311 525 or appropriate methods course		3
311 560		6
311 624		3
		15

Career Education Emphasis		
Twelve semester hours are offered as follows:		
311 605. Concepts for Career Education	Credit	3(3-0)
311 606. Curricular Integration of Career Education	Credit	3(3-0)
311 607. Administration of Career Education Programs	Credit	3(3-0)
311 608. Seminar in Career Education	Credit	3(3-0)

DIRECTORY OF FACULTY AND COURSES

Dorothy Prince Barnett, A.B., Oberlin College; M.A., Syracuse University; Ed.D., Indiana University; Professor

Gladys F. Blue, B.M., Williamette University; M.M., Eastman School of Music, University of Rochester; Ph.D., University of Akron; Associate Professor

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Albert Spruill, B.S., A. & T. College; M.S., Iowa State University; Ed.D., Cornell University; Profes-

sor and Dean of Graduate School

Marian Lee Vick, B.S., Fayetteville State University; M.A., University of Michigan; C.A.G.S., Syracuse University; Ed.D., Duke University; Professor

Leon Warren, B.S., M.S., North Carolina A. & T. State University; Assistant Professor

Tommie M. Young, B.A., Tennessee State University; M.A.L.S., Peabody-Vanderbilt University; Ph.D., Duke University; Professor

Courses	
100	Orientation
300	Introduction to Education
301	Philosophical and Sociological Foundations of Education
302	Field Experiences and Community Services
303	Socio-Philosophical Aspects of Education
343	Methods and Materials of Bibliography
400	Psychological Foundations of Education: Growth and Development
402	Extramural Studies I
413	Learning and Practice
436	Tests and Measurements
500	Principles and Curricula of Secondary Schools
525	Methods of Teaching Art
526	Methods of Teaching English
527	Methods of Teaching Foreign Languages
528	Methods of Teaching Home Economics
529	Methods of Teaching Mathematics
530	Public School Music Methods
531	Vocal Methods and Materials
532	Band Methods
533	The Teaching of Physical Education
534	The Teaching of Health Education
535	Methods of Teaching Science
536	Methods of Teaching Social Sciences
539	Methods of Teaching Speech and Theatre
560	Observation and Student Teaching
561	Seminar
602	Extramural Studies II
605	Concepts of Career Education
606	Curricular Integration of Career Education
607	Administration of Career Education Programs
608	Seminar in Career Education

- 625 Theory of American Public Education
- 626 History of American Education
- 627 The Afro-American Experience in American Education
- 628 Seminar and Practicum in Urban Education
- 641 Teaching the Culturally Disadvantaged Learner

Courses in Media

Core Curriculum

Advanced Undergraduate and Graduate Courses

- 603 Production of Instructional Materials
- 604 Administration of Educational Media
- 611 Utilization of Educational Media

Concentration

- 600 Organization of Media Collections
- 601 Reference Materials
- 609 Production for Instructional Radio and Television
- 610 Broadcasting for Instructional Radio and Television
- 612 Systems Approach and Curriculum
- 613 Developmental Media for Children (books and non-book materials)
- 614 Book Selection and Related Materials for Young People
- 615 Programming for Instructional Radio and Television

Graduate Courses

- 704 Professional Development of Media Personnel
- 705 Programmed Instruction
- 706 Media Retrieval Systems
- 707 Workshop in Educational Media
- 708 Educational Media Research and Internship
- 706 Media in Special Education and Reading
- 712 Advanced Information Services
- 713 Computers in Education
- 715 Advanced Production in Instructional Radio and Television
- 717 Media Services to Business and Industry
- 718 Media in Special Education and Reading

Courses—Early Childhood and Reading

- 315 Family, Community and School
- 451 Foundations of Early Childhood Education

- 510 Teaching Language Arts in the Intermediate Grades
- 511 Teaching Reading in the Intermediate Grades
- 512 Social Studies in the Intermediate Grades
- 513 Strategies in Teaching Science in the Intermediate Grades
- 514 Strategies in Mathematics Instruction for the Intermediate Grades
- 519 Preschool Materials, Methods, and Laboratory
- 556 Curriculum and Methods in Literature, Language Arts and Social Studies in Early Childhood Education
- 557 Curriculum and Methods in Science and Mathematics in Early Childhood Education
- 558 Seminar And Student Teaching in Early Childhood Education
- 620 Foundations in Reading Instruction
- 621 Word Identification/Recognition Skills
- 622 Teaching Reading Through the Primary Years
- 623 Methods and Materials in Teaching Reading in the Elementary School
- 624 Teaching Reading in the Secondary School
- 629 Classroom Diagnosis in Reading
- 630 Reading Practicum
- 631 Reading for the Atypical Learner
- 683 Curriculum in Early Childhood
- 684 Methods in Early Childhood

Department of Human Development and Services

Wyatt D. Kirk, Chairperson

OBJECTIVE

The Special Education Program is designed to develop professional competencies and understandings needed to teach children with special needs with emphasis in cross-categorical in grades K-12. The

program is interdisciplinary and requires a minimum of 129 semester credit hours. Satisfactory completion of the curriculum leads to the Bachelor of Science degree in Special Education and to North Carolina teacher certification in grades K-12.

The objective of the Department of Human Development and Services is to prepare individuals for positions in counseling and human services in both educational and non-educational settings and to strengthen and improve the practitioner's professional skills in the area of human services. The program includes courses in theories and procedures, theoretical and practical examination of human development and changes, technique oriented courses, and a heavy emphasis in supervised practice. Graduates of the program are prepared to work in a variety of counseling settings, middle and secondary schools, junior colleges, and private agencies.

DEGREES OFFERED

Special Education—B.S.
Counselor Education—M.S.
Student Personnel Worker or Agency Counselor—M.S.
Human Resource
Concentration—M.S.

GENERAL PROGRAM REQUIREMENTS

The course of study in Special Education requires a minimum of 54 hours of general education, 24 hours of professional education, 24 hours of major core subjects, 22 hours of concentrated core areas, and 5 hours of electives for a total of 129 credit hours. Other general requirements of the Special Education Program are; University admission, application to the program, successfully complete Core Batteries I, II, and III of the National Teacher Examination, complete English 100, 101, and Speech 250 with a grade of C or better, Mathematics 101, 102 or 111 with a grade of C or better. Demonstrate ability to use the English lan-

guage effectively, and maintain a major average of 2.0 and an overall 2.0 grade point average.

DEPARTMENT REQUIREMENT

Counselor Education Majors—the major in Counselor Education curriculum must complete *60 semester hours of graduate courses. The prerequisites for admission to the program are: 1) Introduction to Guidance and/or its equivalency, and 2) a course in Behavioral Statistics or Test Measurements. A minimum grade of “B” must be achieved in the curriculum. This program is designed for the individual who seeks a School Counselor’s Certificate and the Master’s Degree.

Student Personnel Worker or Agency Counselor—the major in Student Personnel Worker or Agency curriculum must complete *60 semester hours of graduate courses. The prerequisites for admission to the program are: 1) Introduction to Guidance, 2) Personnel Management, 3) Test and Measurements. A minimum grade of “B” must be achieved in the curriculum.

This program is designed for the individual who seeks a non-school Counselor’s Master’s Degree. Also, this program is for students who are interested in a non-certification program and/or interested in professional counseling career in an agency setting or post-secondary student personnel worker.

Human Resources Concentration—the major in the Human Resource concentration must complete *60 semester hours of graduate courses. The prerequisites for admission to the program are: 1) Elementary Statistics or Test Measurements, 2) Industrial Psychology 445 and 3) Personnel Management 522.

**New program requirements are effective as of Fall 1987.*

ACCREDITATION

All education programs are accredited by the National Council

for Accreditation of Teacher Education and approved by the North Carolina State Department of Public Instruction.

CAREER OPPORTUNITIES

Traditionally, students receiving the Master’s degree from Counseling and Guidance have found jobs in school settings (middle and secondary), junior colleges, public agencies (family services, youth services, welfare departments, and state agencies) and private agencies. Presently, and additionally, career and training areas, industry and government or the local, state, and national level.

SEQUENTIAL (SUGGESTED) CURRICULUM ORDER FOR SPECIAL EDUCATION AND COUNSELING MAJORS

SPECIAL EDUCATION SUGGESTED CURRICULUM GUIDE FOR MAJORS

Freshman Year

<i>First Semester</i>	Credit
100 English	3
204 History	3
101 Fund Alg/Trg (1)	3
101 Phy Educ	1
100 Education	1
200 Per Hygiene	2
250 Speech Fund	2
	15

Second Semester

101	English	3
200	Humanities	3
324	Dev Psych	3
102	Fund Alg/Tri (2)	3
102	Phy Educ	1
205	History	3
		<hr/>
		16

Sophomore Year

<i>First Semester</i>	Credit
201 Humanities	3
200 Principles of Geo	3
100 Chemistry	3
300 Intro to Educ	2
350 Intro Excep Child	3
224 Art Appreciation	2
	16

Second Semester

216	Music Apprec	3
100	Biology	4
301	Phil & Socio Ed	2
435	Educ Psych	3
351	Intro Learn Dis	3
352	Intro Emot Dis	3
		<hr/>
		18

Junior Year

<i>First Semester</i>	Credit
451 Ed Early Childhood	3
500 Prin & Curr of Sec Sch	3
563 Adapted Phy Ed	3
511 Teach Read Interm Grd	2
536 Ed Assess & Curr Dev for Excep Infant & Young Child	3
Elective	3
	17

Second Semester

		Credit
537	Ed Assess & Curr Dev for Primary & Intern Excep Child	3
539	Beh Management of Excep Child & Youth	3
540	Sem Educ Assess & Curr Dev	3
538	Ed Assess & Curr Dev for Sec & Adult Excep Person	3
562	Mental Deficiency	3
625	Math for Elem Teach K-8	
		<hr/> 18

Senior Year

<i>First Semester</i>	Credit
631 Read for the Atypical Learner	3
541 Teacher/Parent Community Resources for Except Children	3
542 Diag/Prescrip Teach	3
543 Prac Spec Ed Field Exp	3
664 Meth Mat & Prob Teach Spec Needs Child	3
Electives	2
Student Total =	17

Second Semester

544	Student Teach	6
545	Spec Ed Seminar	3
546	Occup Orient & Train for the Except Youth	3
	Student Total=	<hr/> 12

COUNSELOR EDUCATION MASTER OF SCIENCE

First Year

<i>First Semester</i>	Credit
320-600 Introduction to Guidance	3
Technical Core	3
320-623 Personality Development	3
	9

<i>Second Semester</i>	Credit
311-436 Test and Measurements	3
Technical Core	3
320-706 Organization Administration Guidance Services	3
	<u>9</u>

Second Year

<i>Third Semester</i>	Credit
320-718 Introduction to Counseling	3
310-717 Educational Occupational Education	3
	<u>9</u>

<i>Fourth Semester</i>	Credit
320-716 Techniques of Individual Analysis Elective Core	3
320-720 Theories of Counseling	3
	<u>9</u>

<i>Fifth Semester*</i>	Credit
320-726 Education Psychology	3
320-730 Counseling Practicum I	3
320-731 Group Practicum	3
320-732 Counseling Practicum II	3
320-733 Cross-Cultural Perspective in Counseling	3
320-734 Counseling Special Populations	3
	<u>12</u>

**Comprehensive Examination in the Fifth Semester*

SEQUENTIAL (SUGGESTED) CURRICULUM ORDER FOR MAJORS, STUDENT PERSONNEL WORKER OR AGENCY COUNSELOR MASTER OF SCIENCE

First Year

<i>First Semester</i>	Credit
320-600 Introduction to Guidance	3
311-436 Tests and Measurements	3
Technical Core	3
	<u>9</u>

<i>Second Semester</i>	Credit
320-522 Personnel Management	3
320-707 Research Seminar	3
Technical Core	3
	<u>9</u>

Second Year

<i>Third Semester</i>	Credit
320-623 Personality Development	3
320-716 Techniques of Individual Analysis	3
Technical Core	3
	<u>9</u>

<i>Fourth Semester</i>	Credit
320-717 Educational/ Occupational Information	3
320-718 Introduction to Counseling Elective Core	3
	<u>9</u>

<i>Fifth Semester*</i>	Credit
320-720 Theories of Counseling	3
320-730 Counseling Practicum I	3
320-731 Group Practicum Elective Core	3
320-732 Counseling Practicum II	3
320-733 Cross-Cultural Perspectives in Counseling	3
320-734 Counseling Special Populations	3
	<u>21</u>

SEQUENTIAL (SUGGESTED) CURRICULUM ORDER FOR HUMAN RESOURCE CONCENTRATION MASTER OF SCIENCE

HUMAN RESOURCE CONCENTRATION MASTER OF SCIENCE

First Year

<i>First Semester</i>	Credit
311-435 Test and Measurements	3
320-600 Introduction to Guidance	3
Technical Core	3
	<u>9</u>

<i>Second Semester</i>	Credit
220-445 Industrial Psychology	3
520-522 Business Administration	3
320-623 Personality Development	3
	<u>9</u>

Second Year

<i>Third Semester</i>	Credit
320-718 Introduction to Counseling	3
320-717 Educational/ Occupational Information	3
Technical Core	3
	<u>9</u>

<i>Fourth Semester</i>	Credit
320-716 Techniques of Individual Analysis	3
320-707 Research Seminar	3
320-720 Theories of Counseling	3
320-731 Group Practicum	3
Elective Core	3
	<u>15</u>

<i>Fifth Semester</i>	Credit
320-725 Manpower Internship	3
320-730 Counseling Practicum I	3
Elective Core	3
320-732 Counseling Practicum	3
320-733 Cross-Cultural Perspective in Counseling	3
320-734 Counseling Special Populations	3
	<hr/> 21

* Comprehensive Examination in the fifth semester

** Manpower Internship may be taken between fourth and fifth semesters

DIRECTORY OF FACULTY AND COURSES

Wyatt D. Kirk, B.S., M.S., Ed.D.
Western Michigan University;
Associate Professor and
Chairperson

Harold L. Lanier, B.S., M.S., North
Carolina A&T State University;
Instructor

Aurelia C. Mazyck, B.S., Howard
University; M.S., New York Uni-
versity; Ph.D., The University of
North Carolina at Greensboro;
Associate Professor

Jesse E. Marshall, B.S., Agricultural,
Mechanical and Normal Col-
lege; M.S., Ed.D., Indiana Uni-
versity; Professor

Morris C. Perterkin, B.S., Cheyney
State College; M.S., Governor's
State College; M.Ed. Certificate,
Temple University; Ph.D., Uni-
versity of Pittsburgh; Associate
Professor

Myrtle B. Sampson, B.S., M.L.S.,
North Carolina Central Univer-
sity; M.A., University of Michigan
at Ann Arbor; M. Ed., Ed.D.,
University of North Carolina at
Greensboro; Ph.D., Heed Univer-
sity; Associate Professor

Jane H. Walter, B.A., Wake Forest
University; M.Ed., University of
North Carolina at Chapel Hill;
Post Master's Counseling, Univer-
sity of Delaware; Ed.D., Virginia
Polytechnic Institute and State
University; Associate Professor

Courses: Special Education

- 350 Introduction to Exceptional Children
- 351 Introduction to Learning Disabilities
- 352 Introduction to the Emotional Disturbance
- 451 Speech and Language Stimula-
tion for Exceptional Children
- 536 Educational Assessment and
Curriculum Development for
the Exceptional and Young
Child
- 537 Educational Assessment and
Curriculum Development for
the Primary and Intermediate
Exceptional Child
- 538 Educational Assessment and
Curriculum Development for
the Secondary and Adult
Exceptional Person
- 539 Behavior Management of
Exceptional Children and
Youth
- 540 Seminar in Educational
Assessment and Curriculum
- 541 Teacher-Parent Community
Resources for Exceptional
Children
- 542 Diagnostic Prescriptive
Teaching
- 543 Practicum in Special
Education
- 544 Student Teaching (Field
Experience)
- 545 Special Education Seminar
- 546 Occupational Orientation and
Training for the Exceptional
Youth
- 562 Mental Deficiency
- 661 Psychology of the Exceptional
Child
- 663 Measurement and Evaluation
in Special Education
- 664 Materials, Methods, and Prob-
lems in teaching Special Needs
Child
- 566 Introduction to Mental
Retardation
- 667 Specific Learning Disabilities
- 668 Children & Youth with
Behavioral Disorders

Courses: Counseling Curriculum

- 435 Educational Psychology
- 600 Introduction to Guidance
- 623 Personality Development
- 660 Introduction to Exceptional
Children
- 662 Mental Deficiency
- 706 Organization and Administra-
tion Guidance Services

- 707 Research Seminar
- 715 Measurement for Guidance
- 716 Techniques of Individual
Analysis
- 717 Educational/Occupational
Information
- 718 Introduction to Counseling
- 719 Case Studies in Counseling
- 720 Theories of Counseling
- 721 Independent Studies
- 722 Career Education and Voca-
tional Development Theories
- 723 Student Personnel Services in
Post-Secondary Education
- 724 Advanced Counseling Theories,
Strategies and Techniques
- 725 Human Resources Internship
- 726 Educational Psychology
- 727 Child Growth and Development
- 728 Measurement and Evaluation
- 729 Mental Hygiene for Teachers
- 730 Counseling Practicum I
- 731 Group Practicum
- 732 Counseling Practicum II
- 733 Cross-Cultural Perspectus in
Counseling
- 734 Counseling Special Populations

Department of Health, Physical Education and Recreation

Deborah J. Callaway,
Chairperson

OBJECTIVES

The objectives of the Department
of HPER are to provide

1. instruction in a wide variety
of physical education activi-
ties to meet the needs and
interests of all students in the
required general education
program of the University;
2. recreational outlets for stu-
dents and members of the
University community
through conduct of informal
recreational activities;
3. enrich the total University
program through cooperation

with the programs of such units of the University as the music and dramatic groups, alumni association, agricultural homemaking groups, guidance and health service divisions;

4. a wide range of movement experiences which assist the individual in understanding and accepting himself/herself as a physical being;
5. the individual to creatively express, explore, and apply his/her movement potential in the development of motor skills;
6. the prospective teacher to improve physical fitness and develop emotional stability and social skills for positive human relationships;
7. development of cognitive, psycho-motor, and affective behaviors necessary for careers as K-12 physical education teachers in North Carolina;
8. development of competencies essential for effective athletic coaching and leadership in extracurricula physical activities in the schools;
9. courses in health, physical education which meet State and national teacher certification standards;
10. necessary preparation for students planning careers as teachers of kindergarten, elementary, junior and senior high school physical education and athletic coaches and recreational administration;
11. courses in recreation which meet guidelines of national recreational and park association.

DEGREES OFFERED

Physical Education—B.S.
Recreation
Administration—B.S.
Education—Concentration in
Physical Education—M.S.

* See Graduate School Catalogue

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree program in the Department of Health, Physical Education and Recreation is based upon the general admission requirements of the University.

To be admitted to the Teacher Education Program, students must satisfy the requirements as stated under Teacher Education Admission and Retention Standards

DEPARTMENTAL REQUIREMENTS

Prior to admission to the Teacher Education Block, students should have the approval of their advisor and the Department Chairman.

All "D's" and "F's" received in 400 and 500 level Major and Professional courses must be repeated.

CAREER OPPORTUNITIES

The potential job market for Health and Physical Education majors appears to be promising for the person who has equipped himself or herself with competencies that will give strength in areas allied to Health and Physical Education. Jobs will be available in Health and Physical Education and Coaching. Also there is a great need for trainers in schools and community agencies.

The potential for Recreation is growing rapidly. Areas such as Recreation Center Directors, Administrators in National Park Service, Commercial Recreators, Recreation Therapists will be in great demand in the future.

SUGGESTED CURRICULUM GUIDE FOR A TEACHING MAJOR IN HEALTH AND PHYSICAL EDUCATION

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Mathematics 101	3
History 100	3
Biological Science 100	4
Physical Education 101	1
Education 100	1
Health Education 200	2
	<hr/> 17

<i>Second Semester</i>	Credit
English 101	3
Mathematics 102	3
History 101	3
Physical Science 100	4
Physical Education 102	1
Community Health	2
Physical Education 240	2
	<hr/> 18

Sophomore Year

<i>First Semester</i>	Credit
Education 300	2
Speech 250	2
Humanities 200	3
Foreign Language	3
Psychology 320	3
Physical Education 229	1
Physical Education 234 or	1
Physical Education 237	1
Physical Education 246 or	
Physical Education 249	1
Physical Education 261	1
	<hr/> 17

<i>Second Semester</i>	Credit
Education 301	2
Humanities 201	3
Foreign Language	3
Zoology 160	4
Physical Education 231	1
Physical Education 235 or	
Physical Education 238	1
Physical Education 247 or	
Physical Education 251	1
Physical Education 361	1
	<hr/> 16

Junior Year

<i>First Semester</i>	Credit
Education 400	3
Zoology 469	4
Physical Education 446	3
Physical Education 448 or	
Physical Education 451	1
Physical Education 453 or	
Physical Education 256	2
Physical Education 460	2
Physical Education 462	2
	<u>17</u>

<i>Second Semester</i>	Credit
Education 436	3
Zoology 560	3
Physical Education 445	2
Health Education 442	3
Physical Education 450 or	
Physical Education 452	1
Physical Education 458	2
Physical Education 455 or	
Physical Education 461	2
Health Education 440	2
	<u>18</u>

Senior Year

<i>First Semester</i>	Credit
Health Education 560	2
Physical Education 563	3
Physical Education 568	1
Physical Education 569	3
Physical Education 566	3
Physical Education 567	1
	<u>13</u>

<i>Second Semester</i>	Credit
Education 500	3
Education 560	6
Education 624	3
Physical Education 562 or	
Education 533	3
	<u>15</u>

**SUGGESTED CURRICULUM
GUIDE FOR RECREATION****Freshman Year**

<i>First Semester</i>	Credit
English 100	3
Mathematics 101	3
History 100	3
Biological Science 100	4
Physical Education 101	1
Education 100	1
	<u>15</u>

Second Semester

Physical Education 102	Credit
Chemistry 100	3
Chemistry 110	1
English 101	3
Mathematics 102	3
Physical Education 261	2
History 101	3
Health Education 200	1
	<u>17</u>

Sophomore Year

<i>First Semester</i>	Credit
Humanities 200	3
Physical Education 460	2
Speech 250	2
Psychology 320	3
Physical Education 229	1
Economics 301	3
Physical Education 361	1
	<u>15</u>

<i>Second Semester</i>	Credit
Physical Education 247	1
Humanities 201	3
Sociology 100	3
Health Education 220	2
Physical Education 442	3
Physical Education 231	1
Art 401	3
	<u>16</u>

Junior Year

<i>First Semester</i>	Credit
Recreation 402	2
Political Science 330	3
Recreation 464	3
Music 609	2
Physical Education 448	1
Recreation 561	3
Industrial Ed. 330	2
	<u>16</u>

<i>Second Semester</i>	Credit
Recreation 408	2
Recreation 463	3
Recreation 465	3
Recreation 466	3
Physical Education 344	1
Physical Education 458	2
Psychology 420	3
	<u>17</u>

Recreation 112—Summer Field Experience	6
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Senior Year

<i>First Semester</i>	Credit
Recreation 509	2
Education 611	3
Physical Education 566	3
Recreation 570	3
Business Administra- tion 422	3
	<u>14</u>

<i>Second Semester</i>	Credit
Recreation 510	2
Sociology 305	3
Business Administra- tion 461	3
Electives	4
	<u>12</u>
Total Credit Hours	128

**DIRECTORY OF FACULTY
AND COURSES**

- Deborah Callaway, B.S.; Virginia State College; M.Ed., Virginia Commonwealth University; Ed. D., Virginia Polytechnic Institute and State University; Associate Professor
- Timothy Abney, B.S., Lincoln University; Visiting Lecturer
- Ernestine Compton, B.S., Central State College; Ed.M., Temple University; Assistant Professor
- Donald Corbett, B.S., Lincoln University; M.S., University of Illinois; Head Basketball Coach; Visiting Lecturer
- Leonard Dudka, B.S., M.A., California State Polytechnic College; Ph.D., University of Illinois-Urbana; Associate Professor
- Melvin Groomes, B.S., Indiana University; M.S., North Carolina A. and T. State University; Assistant Professor
- Eleanor W. Gwynn, B.S., Tennessee State A. and I. University; MFA, University of N.C.-Greensboro; Ph.D., University of Wisconsin-Madison; Associate Professor
- George James, B.S., Alabama State; M.S., Florida A&M University; Visiting Lecturer

Victor Karabin, B.S., Westchester State College; M.S., University of Illinois; Instructor
 Roger McKee, B.S., M.S., North Carolina A. and T. State University Instructor
 Orby Moss, B.S., University of Wisconsin, LaCrosse; M.A., Winona State University, Visiting Lecturer
 Randa Russell, A.B., Kentucky State College; B.S., North Carolina A. and T. State University; A.M., University of Michigan; M.P.H., University of Michigan; Professor
 DeWitt C. Thompson, B.S., North Carolina State University; M.S. University of North Carolina-Chapel Hill; Visiting Lecturer
 John L. Williams, B.S., Livingstone University; M.S., South Carolina State College; Visiting Lecturer
 Joseph Williams, B.S., North Carolina A. and T. State University; M.S., University of Michigan; Assistant Professor

Courses

Health

200 Personal Hygiene
 220 Community Health
 440 Advanced Hygiene and Principles of Health Education
 442 First Aid, Safety, and Prevention of Injuries
 560 The Teaching of Health Education

Physical Education

101 Fundamentals of Physical Education
 102 Fundamentals of Physical Education II
 103 Physical Conditioning
 104 Weight Training
 105 Swimming for Non-Swimmers
 106 Wrestling and Combatives
 107 Beginning Racquetball
 108 Beginning Springboard Diving
 109 Fundamentals of Team Sports
 110 Fundamentals of Fitness and Slimnastics
 111 Fundamentals of Gymnastics
 112 Fundamentals of Dance
 229 Modern Dance
 231 Folk and Tap Dance

233 Social and Country Dance
 234 Team Sports: Hockey, Soccer, Basketball
 235 Team Sports: Volleyball, Speedball Softball
 237 Group Games, Football and Basketball
 238 Baseball, Track and Field
 239 Intermediate Dance
 240 Introduction of Physical Education
 246 Individual Sports: Archery, Tennis, Badminton, Golf
 247 Individual Sports: Recreational Games
 248 Adapted Physical Education
 249 Individual Sports and Combatives
 251 Softball, Soccer and Volleyball
 252 Touch/Flag Football, Basketball Speedball
 261 Beginning Swimming
 263 Rhythmics
 335 Adapted Physical Education
 343 Beginning Bowling
 344 Beginning Tennis
 353 Intermediate Bowling
 354 Intermediate Tennis
 361 Intermediate Swimming
 441 Beginning Golf
 443 Skating for Beginners
 445 Kinesiology
 446 History and Principles of Physical Education
 448 Gymnastics I
 450 Gymnastics II
 451 Dance Composition
 452 Applied Dance
 453 Techniques and Methods in Fall and Indoor Sports
 454 Adapted Physical Education
 455 Techniques and Methods of Seasonal and Indoor Activities
 456 Teaching of Soccer, Football and Basketball
 458 Lifesaving and Water Safety
 461 The Teaching of Individual Sports and Net Games
 462 Elementary School Physical Education
 547 Baseball Stunts
 562 The Teaching of Physical Education
 563 Adapted Physical Education
 564 Minor Problems in Health and Physical Education
 565 Problems in Physical Education

566 Organization and Administration of Health and Physical Education
 567 Advanced Techniques and Methods in Physical Education
 568 Physical Education Specialization
 569 Methods of Research and Evaluation in Health and Physical Education

Recreation Administration

112 Summer Field Experience
 402 Field Experience I
 408 Field Experience II
 460 Community Recreation
 463 Principles and Practices of Outdoor Recreation
 464 Group Leadership
 465 Program Planning in Recreation
 466 Camp Administration
 509 Field Experience III
 510 Field Experience IV
 561 Methods of Research and Evaluation in Recreation
 570 Supervision of Recreation and Park Services

Athletic Training

133 Foundations of Athletic Training
 221 Athletic Training Practicum I
 222 Athletic Training Practicum II
 332 Organization and Administration of Athletic Training
 449 Athletic Training Practicum III

Advanced Undergraduate

651 Personal, School and Community Health Problems
 652 Methods and Materials in Health Education for Elementary and Secondary School Teachers
 655 Current Problems and Trends in Physical Education
 656 Administration of Interscholastic and Intramural Athletics
 657 Community Recreation
 658 Current Theories and Practices of Teaching Sports
 669 Exercise Physiology

SCHOOL OF TECHNOLOGY

Earl G. Yarbrough, Dean

The primary focus of the School of Technology is to prepare individuals who are uniquely proficient in the application of basic science and technology. Thus, faculty of the school are interested in what industry, business and education want and need. As a result, our goal is to educate the whole person. Students develop not only their technical skills but their personality, cooperativeness, innovativeness, concern for the organization, communications skills and dependability. Graduates of the school are equipped to meet the new and emerging challenge of a modern high technological society.

Curriculum and programs of the school are continually reviewed by advisory groups associated with the various professions represented by the school. Based upon this input, the curriculum is reflective of what business, industry and education need.

Programs of the school that are designed to prepare individuals for industry are built upon a technical-management orientation. Thus, graduates pursue career opportunities in a variety of fields ranging from research and design to inspection and distribution. Graduates are employed as project managers, quality control engineers, operation officers, shift superintendents, employment managers, safety engineers, occupational health specialists, construction managers, loss prevention representatives, etc.

Several of the programs of the school are designed to prepare individuals for a variety of educational careers. Thus, graduates of the school are employed as industrial arts, technology education, vocational education and safety and driver education instructors at the secondary and post-secondary levels. In addition, many graduates of the education program are employed in the private and governmental sector in a variety of occupational areas.

The specific objectives of the school are:

1. To provide an environment which nurtures individual development and creativity through scholarly pursuits;
2. To provide a basic knowledge of management skills and problem solving techniques;
3. To develop scientific and technological proficiency through organized instruction and research;
4. To prepare persons to secure positions in industrial-technical training and teaching at the secondary and post-secondary level;
5. To prepare persons to secure positions of a technical-management nature in business, industry, and government; and
6. To provide advanced technological competencies and leadership in the utilization of computers in industry, business, and technical settings.

ACCREDITATION

The undergraduate programs in Automotive Technology, Electronics, Manufacturing and Construction Management are accredited by the National Association of Industrial Technology (NAIT). The programs in Technology Education and Driver Education are accredited by the National Council For Accreditation of Teacher Education (NCATE) and the State Department of Public Instruction (SDPI).

DEGREES OFFERED

Industrial Technology
Automotive Technology—B.S.
Construction Management—B.S.
Electronics Technology—B.S.
Manufacturing Technology—B.S.
Occupational Safety and Health—B.S.
Industrial Arts Education—B.S.
Vocational Industrial Education—B.S.
Safety and Driver Education—B.S.
Industrial Arts Education—M.S.
Vocational-Industrial Education—M.S.
Safety and Driver Education—M.S.

GENERAL PROGRAM REQUIREMENTS

Admission requirements for the School of Technology are the same as those for the University. Requirements for graduation vary from department to department. Students are responsible for meeting all academic requirements for graduation established by both the University and their chosen department.

Community College and Technical Institute graduates as well as other transfer students may be admitted to undergraduate programs in Industrial Technology and Industrial Education with advanced classification by submitting their credentials to the University admissions office. The maximum number of transfer credits allowed with the Associate Degree Program is 62 semester hours of approximately junior status.

Department of Manufacturing and Automotive Technology

**Aminur R. Chowdhury,
Chairperson**

OBJECTIVES

The Department of Manufacturing and Automotive Technology at North Carolina A&T State University features two programs of study designed to prepare management-oriented, technical professionals with supervisory and administrative knowledge to function effectively in the Manufacturing and Automotive economic-enterprise system.

The Manufacturing Technology curriculum is designed to cover the full range of processes encountered in a Manufacturing environment. These processes are grouped into three categories: manufacturing management technology, manufacturing production technology & manufacturing personnel.

The Automotive curriculum is designed to cover the methods, procedures, and theories for supervising and the administration of an automotive service environment which includes: automotive data analysis technology, automotive management technology and automotive service management.

DEGREES OFFERED

Manufacturing Technology—B.S.
Automotive Technology—B.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree program in the Department of Manufacturing and Automotive Technology is based upon the general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

Technology majors must complete 125 semester hours of University courses. A minimum of 16 semester hours must be completed in one of the technical electives. A minimum grade of "C" must be earned in all major courses.

Graduates of technical institutes and community colleges who have earned the Associate Degree in technology areas may be admitted to the Manufacturing or Automotive Technology program as juniors. Specific course requirements for these students will have to be made on an individual basis after their previously earned credits have been assessed. The typical student in this program will be required to take at least 63 additional semester hours.

Any student transferring to the Department of Manufacturing and Automotive Technology from other disciplines must have a minimum of 2.0 G.P.A.

ACCREDITATION

The Department of Manufacturing and Automotive Technology is accredited by The National Association of Industrial Technology.

CAREER OPPORTUNITIES

Graduates of our Manufacturing and Automotive Technology program are very successful in receiving employment in industrial and business positions in supervision, management, engineering technical sales, customer relations, service management and production engineering.

CURRICULUM FOR A DEGREE IN MANUFACTURING OR AUTOMOTIVE TECHNOLOGY

Freshman Year

<i>First Semester</i>	Credit
Eng. 100	3
Math 111	4
Chem. 100	3
Chem. 110	1
T.E. 233	3
CM 190	3
	16

<i>Second Semester</i>	Credit
Eng. 101	3
Math 112	4
Natural Science Elective	4
T.E. 234	3
MAT 191	2
	16

Sophomore Year

<i>First Semester</i>	Credit
Social Science Elective	3
MAT 293	3
**Drafting Electives	3
Physics I 225	3
Physics Lab 235	1
Humanities Electives	3
	16

<i>Second Semester</i>	Credit
Social Science Elective	3
ECT 230	3
Physics II 226	3
Physics Lab 236	1
Humanities Electives	3
Electives	3
	16

Junior Year

<i>First Semester</i>	Credit
Accounting 221	3
***B.A. 220	3
Econ. 305	3
MAT 491	3
****Technical Electives	4
	16

<i>Second Semester</i>	Credit
Personal Hygiene 200	2
***B.A. 422	3
Math 240	3
Speech Fundamentals 250	3
****Technical Electives	4
Electives	2
	17

Senior Year

<i>First Semester</i>	Credit
CMS 492	2
MAT 493	3
Psy. 445	3
B.A. 481 or CMS 592	3
****Technical Electives	4
	15

<i>Second Semester</i>	Credit
B.A. 522	3
CMS 593	3
****Technical Electives	4
Electives	3
	13

* Chemistry 101 may be substituted for Chemistry 100

** Drafting electives are determined in consultation with Advisor

*** The Business Courses listed in the junior and senior year are recommended. Other business courses may be accepted on approval of Advisor.

**** Technical Electives must be from Manufacturing or Automotive Technology

NOTE: Military/Air Science may be used as electives.

DIRECTORY OF FACULTY

Aminur R. Chowdhury, B.S., Sam Houston State University; M.Ed., Texas A&M University; Ed.D., West Virginia University; Professor and Chairperson

John H. Morris, B.S., Johnson C. Smith University; B.S., A&T State University; M.A., N.C. State University; Ph.D., Iowa State University; Assistant Professor

Mansur Rastani, B.S., Aryamehr Institute of Technology; M.S., Center for Graduate Studies and Research; Ph.D., N.C. State University; Assistant Professor

W. Christopher Musselwhite, B.S., Appalachian State University; M.A., West Virginia University; Ed.D., North Carolina State University; Assistant Professor

Russell Rankin, Jr., B.S., A&T State University; M.S., North Carolina State University; Assistant Professor
 Thurman Exum, B.S., A&T State University; M.S., North Carolina A&T State University; Lecturer

COURSES

- 191 Industrial Technology Processes
- 251 Small Engines
- 252 Automotive Car and Engine Care
- 275 Fundamental of Metal Joining I
- 276 Fundamental of Metal Joining II
- 293 Power Technology
- 455 Auto Body Repairs and Refinishing
- 456 Automobile Body Designs and Repairs
- 470 Manufacturing Industries
- 471 Metal Technology
- 491 Mechanic of Materials
- 493 Industrial Plant Planning and Management
- 495 Dimensional Metrology Quality Control
- 496 Electro-Mechanical Controls
- 497 Co-Operative Training in Industry I
- 498 Co-Operative Training in Industry II
- 591 Industrial Economics
- 596 Electro-Mechanical Control Systems (Advanced)
- 599 Independent Study
- 651 Power Industries and Technology
- 673 Advanced General Metals I
- 674 Advanced General Metals II
- 690 Special Problems

NOTE: MAT 497 and 498 may be taken for technical elective credit with approval of Advisor. MAT 690 must be approved by Advisor.

TECHNICAL ELECTIVES IN MANUFACTURING TECHNOLOGY

- 472 Manufacturing Processes—Production I
- 473 Manufacturing Processes—Production II
- 474 Manufacturing Technology of Polymers
- 475 Manufacturing Advanced Polymer Processing
- 480 Mechanical Design and Manufacturing Problems

- 481 Manufacturing Processes (Metallurgy)
- 576 Manufacturing-Production and Operation Management

TECHNICAL ELECTIVES IN AUTOMOTIVE TECHNOLOGY

- 254 Automotive Fundamentals
- 255 Automotive Power Transmission
- 451 Automotive Instrumentation and System Analysis
- 452 Automotive Service Management

Department of Technology Education

Robert B. Pyle, Chairperson

OBJECTIVES

The major objective of the Department of Technology Education is to provide quality competency based instruction so that men and women will be prepared to enter the fields of Industrial Arts/Technology Education, Safety and Driver Education and Vocational Industrial Education. In addition, the Department guides majors in developing those critical competencies in the sciences, communications, mathematics, and technical specialties essential to secure positions in related industrial, business and government careers.

DEGREES OFFERED

- Industrial Arts Education—B.S.
- Vocational Industrial Education—B.S.
- Safety and Driver Education—B.S.
- *Industrial Arts Education—M.S.
- *Vocational-Industrial Education—M.S.
- *Safety and Driver Education—M.S.

*See the Graduate School Bulletin.

GENERAL PROGRAM REQUIREMENTS

Student admission to undergraduate degree programs in the Department of Technology Education is based on general admission requirements of the University.

Admission, retention, and state certification of students in Technology Teacher Education programs are based on policies described under the School of Education.

Persons with technical preparation and interest in post secondary vocational technical education or technical training programs in private industry or business which do not require teacher certification may pursue a bachelors degree in the Department of Technology Education. Students pursuing this option will not be recommended or qualified to receive teacher certification in North Carolina. In addition, they will be required to sign a waiver acknowledging that they are not seeking recommendation for teacher certification in North Carolina.

Community College and Technical Institute graduates and other transfer students may be admitted to undergraduate Technology Education programs with advanced classification by submitting credential to the University Admissions Office for individual assessment. Maximum transfer credit from Associate Degree Technical programs is 62 semester hours or approximately Junior status.

DEPARTMENTAL REQUIREMENTS

Industrial Arts/Technology Education Major. Students must complete 130 semester hours, which includes general studies, Professional Education, major courses, and electives. Included in the major sequence are technical electives. The grade point average in major courses must be 2.0 or better.

Vocational Industrial Education Major. Students must complete 133 semester hours, which includes general studies, Professional Education, major courses, and electives. Included in the major sequence are technical electives concentrated in one of the following six optional

cluster areas listed below:

Construction Industries
Drafting and Graphic Industries
Electronic Industries
Manufacturing Industries
Service Industries
Transportation Industries

The grade point average in major courses must be 2.0 or better.

For persons who possess prior technical transfer credits or work experience in recognized areas of trade and industrial education, further technical sub-options are available within the cluster areas above. Such students will pursue individualized programs tailored to meet their specific needs, provided the following conditions are satisfied:

1. The area selected for a technical concentration in the major must be recognized by the North Carolina State Department of Public Instruction for T&I teacher certification.
2. The student must initially enter the program with advanced classification.

—Persons holding an Associate Degree in the technical field may apply such transfer credits toward meeting technical course requirements.

—Persons meeting University admission requirements desiring to substitute work/trade experience to meet technical course requirements in the field selected may receive college credit by satisfactory completion of a competency-based examination.

Safety and Driver Education Major. Students must complete 129 semester hours, which includes general studies, Professional Education, major courses and electives. The grade point average in major courses must be a 2.0 or better.

NOTE: Transfer students, and persons applying college credits earned through competency examinations who are enrolled in individualized programs of study, may apply a maximum of 24

semester hours of credit toward meeting technical course requirements in Technology Education.

ACCREDITATION

The Technology Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education and are approved by the North Carolina State Department of Public Instruction.

CAREER OPPORTUNITIES

Excellent employment opportunities exist for persons trained in Technology Education. Public schools: K-12, community colleges, technical institutes, colleges, and universities in North Carolina and other states are in constant need of securing qualified teachers in Technology Education. Teaching positions continue to remain open for Technology Education specialists,



and shortages of personnel are reported in many states. Schools are experiencing major difficulty in locating competent persons to fill Technology Education vacancies.

Many career opportunities in addition to teaching also exist for Vocational-Industrial Education graduates. These include industrial-business enterprises, government agencies, rehabilitation and manual arts therapy centers, private schools and recreational camps. An estimated one-fourth of Vocational Industrial Education graduates are employed as training directors, managers, supervisors, engineering assistants, sales, and safety personnel.

Teaching, safety management, municipal agencies, state agencies, federal agencies, industry, and research are some of the career opportunities that are available to individuals competent in the Safety and Driver Education field.

INDUSTRIAL ARTS/ TECHNOLOGY EDUCATION CURRICULUM

Freshman Year

<i>First Semester</i>	Credit
*English 100	3
Technology Education 233	3
Technology Education 261	3
Physical Education Elective	1
*Physics Elective	4
*Mathematics 101	3
	17

<i>Second Semester</i>	Credit
*English 101	3
Technology Education 234	3
Sociology Elective	3
*Mathematics 102	3
*Physical Education 200	2
Technology Education 130	3
	17

Sophomore Year

<i>First Semester</i>	Credit
*Social Science Elective	3
*Humanities Elective	3
*Natural Science Elective	4
Technology Education 415	3
Electronics and Computer Technology 230	3
	16

<i>Second Semester</i>	Credit
*Social Science Elective	3
*Humanities Elective	3
Economics 300	3
Technology Education 263	3
Technology Education 334	3
Electronics and Computer Technology 231	3
	18

Junior Year

<i>First Semester</i>	Credit
Technology Education 664	3
Technology Education 382	3
Technology Education 510	4
Technical Elective	3
Speech 250	3
	16

<i>Second Semester</i>	Credit
Manufacturing and Automotive Technology 293	3
Psychology Elective	3
Technology Education 463	3
Technology Education 662	3
Technical Elective	3
Technology Education 665	3
	18

Senior Year

<i>First Semester</i>	Credit
Technology Education 462	3
Manufacturing and Automotive Technology 472	4
Curriculum Instruction 400	3
Curriculum Instruction 436	3
Technology Education 566	3
	16

<i>Second Semester</i>	Credit
Curriculum Instruction 500	3
Curriculum Instruction 560	6
Curriculum Instruction 624	3
	12

VOCATIONAL INDUSTRIAL EDUCATION CURRICULUM

Freshman Year

<i>First Semester</i>	Credit
Technology Education 233	3
Technology Education 261	3
*English 100	3
*Physics Elective	4
*Mathematics 111	4
	17

<i>Second Semester</i>	Credit
Technology Education 234	3
Technology Education 263	3
*English 101	3
Sociology Elective	3
*Physical Education 200	2
*Mathematics 112	4
	18

Sophomore Year

<i>First Semester</i>	Credit
Technical Elective—Spec.	3
Economics 300	3
*Humanities Elective	3
*Social Studies Elective	3
Technical Education Elective	3
Manufacturing and Automotive Technology 472	3
	18

<i>Second Semester</i>	Credit
Technical Elective—Spec.	3
*Natural Science Elective	4
*Humanities Elective	3
*Social Studies Elective	3
Speech 250	3
Physical Education Elective	1
	17

Junior Year

<i>First Semester</i>	Credit
Technical Elective—Spec.	3
Technology Education 462	3
Technology Education 382	3
Technology Education 510	3
Psychology Elective	3
Technology Education 465	3
	18

<i>Second Semester</i>	Credit
Technical Elective—Spec.	6/7
Technology Education 463	3
Technology Education 662	3
Natural Science Elective	4
	17

Senior Year

<i>First Semester</i>	Credit
Technology Education 566	4
Technical Elective—Spec.	3
Curriculum Instruction 400	3
Curriculum Instruction 436	3
Technical Elective	3
	16

*University Requirements

<i>Second Semester</i>	Credit
Curriculum Instruction 500	3
Curriculum Instruction 560	6
Curriculum Instruction 624	3
	<u>12</u>

TECHNICAL SPECIALIZATION AREAS

(Select Technical Specialization from one of the following areas)

Transportation Industries:

TE 233 Technology Drafting I	3
MAT 293 Power Technology	3
MAT 254 Automotive Fundamentals	4
MAT 255 Automotive Power Transmission	4
MAT 451 Automotive Instrumentation and System Analysis	4
MAT 452 Automotive Service Management	4

Construction Industries:

TE 432 Architectural Drafting	3
CM 210 Construction Technology	3
CM 213 Wood Technology	3
CM 215 Residential Construction	4
CM 216 Commercial/Industrial Construction	4
CMS 217 Construction Estimating	4

Drafting and Graphic Industries:

CM 210 Construction Technology	3
TE 233 Technology Drafting I	3
TE 234 Technology Drafting II	3
TE 333 Electric/Electronic Drafting	3
TE 434 Advanced Architectural Drafting	3
TE 436 Machine Design Drafting	3

Electronic Industries:

TE 333 Electric/Electronic Drafting	3
CM 210 Construction Technology	3
ECT 231 Electronic Communications Circuits	3
ECT 430 Industrial Electronics	3
ECT 431 Digital Electronics	3
ECT 432 Microprocessor Applications	4

Manufacturing Industries:

TE 233 Technology Drafting I	3
CM 210 Construction Technology or MAT 293 Power Technology	3
MAT 473 Mfg. Processes—Production I	4
MAT 472 Manufacturing Processes—Production I	4
MAT 480 Mechanical Design and Manufacturing Problems	4
MAT 474 Manufacturing Technology of Polymers	4
MAT 481 Manufacturing Processes (Metallurgy)	4

SAFETY AND DRIVER EDUCATION CURRICULUM

Freshman Year

<i>First Semester</i>	Credit
Social Science Elective	3
Mathematics 111	4
Natural Science Elective	4
Physical Education Elective	1
English 100	3
Elective	2
	<u>17</u>

Second Semester

Social Science Elective	3
Mathematics 112	4
Physical Education Elective	1
English 101	3
Elective	3
	<u>14</u>

Sophomore Year

<i>First Semester</i>	Credit
Technology Education 254	3
Natural Science Elective	4
Curriculum Instruction 300	2
Psychology Elective	3
Humanities Elective	3
Elective	3
	<u>18</u>

Second Semester

Technology Education 353	3
Physics Elective	3
Curriculum Instruction 301	2
Speech 250	3
Humanities Elective	3
Elective	2
Physical Education 200	2
	<u>18</u>

Junior Year

<i>First Semester</i>	Credit
Technology Education 356	3
Technology Education 455	3
Technology Education 557	3
Economics 301	3
Sociology Elective	3
Curriculum Instruction 400	3
	<u>18</u>

Second Semester

Technology Education 454	3
Technology Education 456	3

Technology Education 558	3
Curriculum Instruction 436	3
Elective	2
Electronics and Computer Technology 230	3
	<u>17</u>

Senior Year

<i>First Semester</i>	Credit
Technology Education 655	3
Technology Education 658	3
Curriculum Instruction 611	3
Elective	3
	<u>12</u>

Second Semester Credit

Technology Education 561	3
Curriculum Instruction 500	3
Curriculum Instruction 560	6
Curriculum Instruction 624	3
	<u>15</u>

DIRECTORY OF FACULTY

Robert B. Pyle, B.A., M.A., Trenton State College; Ph.D., University of Pittsburgh; Professor and Chairperson
Earl Yarbrough, B.A., Wichita State University; M.A., California State University-Los Angeles; Ph.D., Iowa State University; Professor and Dean
Isaac Barnett, B.S., M.S., North Carolina A&T State University; Ed.D., Michigan State University; Professor
Nancy G. Hinckley, B.S., Trenton State College; M.S., Ph.D., Michigan State University; Assistant Professor
Naomi Richmond, B.S., North Carolina A&T State University; M.Ed., University of North Carolina-Greensboro; Ed.D., University of Illinois-Urbana; Assistant Professor
David Dillon, B.S., Northwestern State University of Louisiana; M.A., University of Louisiana; M.A., University of Northern Colorado; Ed.D., North Carolina State University; Assistant Professor

COURSES IN TECHNOLOGY EDUCATION UNDERGRADUATE

Undergraduate Courses

- 210 General Crafts
- 218 Introduction to General Shop and Tool Technology
- 382 Programming "Basic" for Technology Education
- 412 Furniture Design and Construction
- 413 Woodturning
- 415 Comprehensive General Shop
- 510 Technology Education General Laboratory

Technical Speciality in Industrial Arts/Technology Education—Graphic Communications

- 130 Graphic Communication Technology
- 230 Introduction to Photo Technology
- 231 Advanced Photography
- 233 Drafting Technology I
- 234 Drafting Technology II
- 333 Electric/Electronic Drafting
- 334 Architectural Drafting
- 430 Technical Illustrations and Design
- 433 Industrial Design I
- 434 Advanced Architectural Drafting
- 435 Architectural Design and Modeling
- 533 Machine Design Drafting
- 534 Computer Aided Drafting and Design
- 536 Tool and Machine Design

Technical Speciality in Safety and Driver Education

- 254 Basic Safety and Driver Education
- 353 Techniques of Laboratory Instruction
- 356 Behavioral Aspects of Accident Prevention
- 454 First Aid and Emergency Care of the Injured
- 455 Legal Aspects in Safety Education
- 456 Alcohol and Drugs—In Safety and Driver Education
- 557 Police and Traffic Court Administration
- 558 Introduction to Highway Traffic Administration
- 561 Methods of Teaching Safety and Driver Education

Professional Core Courses in Technology Education

- 261 Introduction to Industrial Education
- 263 Evolution and Organization of Technology
- 462 Design, Management and Safety in the Technology Education Laboratory
- 463 Career Guidance and Occupational Information
- 465 Instructional Analysis
- 566 Industrial Education Teaching Methods

COURSES FOR ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS

- 610 Internship in Industry I
- 611 Internship in Industry II
- 616 Plastic Technology
- 617 General Crafts
- 618 Vocational Education for Special Needs
- 619 Curriculum Laboratory in Construction Technology Education
- 620 Curriculum Laboratory in Manufactory Technology Education
- 631 Advanced Computer Aided Design
- 635 Graphic Arts
- 651 Driver Education and Teacher Training
- 652 Advanced Driver Education and Teacher Training
- 653 Driver Education and General Safety
- 654 Highway and Transportation Systems
- 655 Automotive and Technology for Safety and Driver Education
- 656 Highway Traffic Administration
- 657 Traffic Engineering in Safety and Driver Education
- 658 Curricula Integration and Safety Education
- 659 Motorcycle Safety Education
- 660 Industrial Cooperative Programs
- 661 Organization of Related Study Materials
- 662 Industrial Course Construction
- 663 History and Philosophy of Industrial Education
- 664 Occupational Exploration for Middle Grades
- 665 Middle Grades Industrial Laboratory
- 666 Curriculum Modification for

Vocational Education Special Needs Personnel

- 668 Independent Studies in Industrial Education
- 669 Safety in the Instructional of Technology Education
- 670 Introduction to Workplace Training and Development
- 671 Methods and Techniques of Workplace Training and Development
- 672 Curriculum Development Using microcomputers in Industrial Education
- 682 Microcomputer Systems for Industrial Education

Department of Construction Management and Safety

Walter E. Dukes, Chairperson

OBJECTIVES

The Department of Construction Management and Safety at North Carolina Agricultural and Technical State University has a two-fold purpose: to prepare men and women to become associated with the scientific, managerial, and supervisory activities of the Construction Industry and the Occupational Safety and Occupational Health professions.

The program in Construction Management (CM) emphasizes all areas of construction from the viewpoint of the contractor/constructor. This includes all aspects from planning and operations to materials and structures. Students are given instruction in supervision and management, and exposed to the creative problem solving process.

The program in Occupational Safety and Health (OSH) is concerned with the recognition and evaluation of occupational safety and health hazards associated with mechanical systems, material handling, electrical systems, chemical processes, and illustrates controls through engineering revision, safeguarding and personal protective equipment.

DEGREES OFFERED

Construction Management—B.S.
Occupational Safety and Health—
B.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree program in the Department of Construction Management and Safety is based upon the general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

Students desirous of majoring in the programs of the Department of Construction Management and Safety must have a strong background in Math, Science and Communication Skills. Some Computer Skills are also recommended.

All majors in the department are expected to maintain a minimum grade point average (G.P.A.) of 2.0. A minimum grade of "C" must be earned in all major courses.

Any student transferring to the Department of Construction Management and Safety from other disciplines must have a minimum of 2.0 G.P.A.

Construction Management Majors must complete 124 semester hours of University courses. A minimum of 16 semester hours must be completed in the technical courses for the Construction Management Major.

The major in Occupational Safety and Health must complete a minimum of 129 semester hours of University courses. Included in these 129 semester hours are forty-six semester hours of Occupational Safety and Health courses at the 200 level or above.

ACCREDITATION

The Construction Management Program is accredited by the National Association of Industrial Technology.

CAREER OPPORTUNITIES

Graduates of our Construction Management and Safety Program

are very successful in receiving employment in industrial, governmental, and business positions as supervisors, managers, engineers, technical salespersons and researchers.

Curriculum For A Major In Construction Management

Freshman Year

<i>First Semester</i>	Credit
Eng. 100	3
Math 111	4
*Chem. 100	3
Chem. 110	1
**Drafting Elective	3
CM 190	2
	16

<i>Second Semester</i>	Credit
Eng. 101	3
Math 112	4
Natural Science Elective	4
**Drafting Elective	3
MAT 191	2
	16

Sophomore Year

<i>First Semester</i>	Credit
Soc. Sci. Elective	3
MAT 293	3
**Drafting Elective	3
Physics Elective	4
Humanities Elective	3
	16

<i>Second Semester</i>	Credit
Soc. Sci. Elective	3
ECT 230	3
Physics Elective	3
Humanities Elective	3
Electives	3
	16

Junior Year

<i>First Semester</i>	Credit
Accounting 221	3
***B.A. 220	3
Econ. 305	3
MAT 491	3
****Technical Elective	4
	16

<i>Second Semester</i>	Credit
H.E. 200	2
***B.A. 422	3
Math 240	3
Speech 250	3

****Technical Elective	4
CM 492	2
	17

Senior Year

<i>First Semester</i>	Credit
MAT 493	3
Psy. 445	3
***CM 592 or B.A. 481	3
****Technical Elective	4
Electives	2
	15

<i>Second Semester</i>	Credit
***B.A. 522	3
CM 593	3
****Technical Elective	4
Electives	3
	13

*Chemistry 101 may be substituted for Chemistry 100.

**Drafting electives are determined by Advisor.

***The Business Courses listed in the junior and senior year are recommended. Other Business Courses may be accepted on approval of Advisor.

****Technical Electives must be from Technical Courses in Construction Management.

NOTE: Military/Air Science may be used as electives.

Curriculum for a Major in Occupational Safety and Health

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Math 111	4
Chemistry 106	3
Chemistry 116	2
OSH 211	2
Drafting Elective	3
	17

<i>Second Semester</i>	Credit
English 101	3
Math 112	4
Chemistry 107	3
Chemistry 117	2
OSH 212	2
Drafting Elective	3
	17

Sophomore Year

<i>First Semester</i>	Credit
Humanities Elective	3
OSH 311	2
Physics 225	3
Physics 235	1

Chemistry 221	3
Chemistry 223	2
Psychology 320	3
	17
<i>Second Semester</i>	Credit
Humanities Elective	3
OSH 312	3
Physics 226	3
Physics 236	1
English 331	3
Psychology 322	3
	16

Junior Year

<i>First Semester</i>	Credit
Economics 301	3
M. E. 226	2
M. E. 236	1
Natural Science Elective	4
Bus. Adm. 422	3
OSH 413	3
	16

<i>Second Semester</i>	Credit
Bus. Adm. 461	3
Natural Science Elective	4
Physical Ed.	1
OSH 414	2
OSH 415	3
OSH 416	3
	16

<i>Summer</i>	
OSH 501	3-6

Senior Year

<i>First Semester</i>	Credit
Social Science Elective	3
OSH 411	3
OSH 511	2
OSH 512	2
OSH 513	2
OSH 514	2
Elective	3
	17

<i>Second Semester</i>	Credit
OSH 515	3
OSH 516	3
OSH 517	3
Elective	4
	13

DIRECTORY OF FACULTY AND COURSES

Walter E. Dukes, B.S., Alcorn Agricultural and Mechanical College; M.S., Indiana State University; Ph.D., Purdue University; Professor and Chairperson

Arlington W. Chisman, B.S., M.Ed., Virginia State University; Ph.D., The Ohio State University; Professor
Clifton J. McMullen, B.S., Jackson State University; M.A., Ball State University; Instructor
Maxine R. Moore, B.S., Bennett College; MSPH, University of N.C. at Chapel Hill; Assistant Professor
Charles L. Crocker, B.S.E.E., M.S.E.E., Auburn University; M.B.A., University of North Carolina-Greensboro; Visiting Lecturer
Dana C. Ripley, B.S., M.S., East Tennessee State University; Visiting Lecturer
Walter B. Thorburn, B.S., University of N.C. at Chapel Hill; Visiting Lecturer

Courses

- 190 Introduction to Construction Technology and Construction
- 210 Construction Technology
- 213 Wood Technology
- 490 Human Relations
- 492 Communicating Technical Specification
- 497 Co-Operative Training in Industry I
- 498 Co-Operative Training in Industry II
- 501 Internship
- 592 Project Management
- 593 Industrial Safety
- 599 Independent Study
- 690 Special Problems

NOTE: CM 497 or CM 498 may be taken for technical elective credit with approval of Advisor.

Technical Electives in Construction Management

- 215 Residential Construction
- 216 Commercial/Industrial Construction
- 217 Construction Estimating
- 412 Mechanical Systems for Building
- 418 (413) Principles of Construction Management
- 419 (414) Methods in Plane Surveying
- 570 Environmental Controls, AC and Heating Systems
- 571 Commercial Refrigeration, Heating and Ventilation

Technical Electives in Occupational Safety and Health

- 211 Introduction to Industrial Processes
- 212 Introduction to Occupational Safety and Health
- 311 General Concepts in Occupational Safety and Health
- 312 Air Quality for the Safety Professional
- 411 Hazardous Materials for the Safety Professional
- 413 Industrial Hygiene I
- 414 Flammable Materials for the Safety Professional
- 415 Mechanical and Electrical Systems for the Safety Professional
- 416 Industrial Hygiene II
- 511 Education/Training Methods for the Safety Professional
- 512 Facilities for the Safety Professional
- 513 Human Factors
- 514 Industrial Relations
- 515 Evaluation and Control Methods in Occupational Safety and Health for the Safety Professional
- 516 Management Techniques in Occupational Safety and Health for the Safety Professional
- 517 Materials Handling for the Safety Professional

Department of Electronics & Computer Technology

T. H. Avery, Acting Chairperson

OBJECTIVES

Students in Electronics and Computer Technology will develop competencies related to application and utilization of electronics and computers, production processes, principles of distribution and concepts of industrial management and human relations. Students will develop a proficiency level in the several physical sciences, communication skills, mathematics, design, and technical

skills to permit the graduate to cope with technical, managerial, and production problems.

DEGREES OFFERED

Electronics Technology—B.S.

GENERAL PROGRAM REQUIREMENTS

The admission of students to the undergraduate degree program in the Department of Electronics and Computer Technology is based upon the general admission requirements of the University.

DEPARTMENTAL REQUIREMENTS

Electronics and Computer Technology majors must complete 125 semester hours of University courses. A minimum 16 semester hours must be completed in the technical course structure. A minimum grade of "C" must be earned in all major courses.

Graduates of technical institutes and community colleges who have earned an Associate Degree may be admitted to the Electronics and Computer Technology program as juniors. Specific course requirements for these students will have to be made on an individual basis after their previously earned credits have been assessed. The typical student in this program will be required to take at least 63 additional semester hours. In effect, such students will be engaged in a program culminating in earning the B.S. degree.

Any student transferring to the Department of Electronics and Computer Technology from other disciplines must have a minimum of 2.0 G.P.A.

ACCREDITATION

The program of Electronics Technology is accredited by the National Association of Industrial Technology.

CAREER OPPORTUNITIES

Graduates of our Electronics and Computer Technology program are very successful in receiving employment in industry and business positions in supervision, management, and technical sales as Project Engineers, Industrial Engineering Analyst, Quality Control Engineer, Systems Engineer, Manufacturing Supervisor, Shift Superintendent.

Curriculum for a Degree in Electronics & Computer Technology

Freshman Year

<i>First Semester</i>	Credit
English 100	3
Math 111	4
*Chemistry 100	3
*Chemistry 110	1
TE 233	3
CM 190	2
	16

<i>Second Semester</i>	Credit
English 101	3
Math 112	4
Biology 100	4
TE 234	3
MAT 191	2
	16

Sophomore Year

<i>First Semester</i>	Credit
History Elective	3
MAT 293	3
CM 492	2
Physics 225	4
Humanities Elective	3
	15

<i>Second Semester</i>	Credit
History Elective	3
ECT 230	3
Physics 226	4
Humanities Electives	3
Elective	3
	16

Junior Year

<i>First Semester</i>	Credit
***BA 220	3
ACCT 221	3
***BA 422	3
Math 240	3
****ECT 231	3
Electives	2
	17

<i>Second Semester</i>	Credit
Health Ed 200	2
Economics 305	3
MAT 491	3
****ECT 234	3
Electives	2
**Drafting Elective	3
	16

Senior Year

<i>First Semester</i>	Credit
***BA 481	3
CM 592	3
***BA 522	3
****Technical Elective	3
****Technical Elective	3
	15

<i>Second Semester</i>	Credit
PSY 320	3
CM 593	3
****Technical Elective	3
****Technical Elective	4
Elective	3
	16

****Technical Specialization in Electronics Technology

Technical Core Requirements

	Credit
ECT 231	3
ECT 234	3
ECT 430	3
ECT 431	3
ECT 432	4

Technical Elective

ECT 433	3
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NOTE: Technical Specialization courses are taken in sequence

****Drafting Electives:** TED 333, 334, 433, 434, 533, 534, 631

**Chemistry 101 may be substituted for Physical Science with consent of advisor.*

***Drafting electives are determined by Technical Specialization with consent of advisor.*

NOTE: *Military or Air Science may be used as electives*

****The Business Courses listed in the junior and senior year are recommended. Other Business Courses may be accepted with consent of advisor.*

*****Technical courses must be from the Technical Specialization.*

DIRECTORY OF FACULTY

Thomas Avery, B.S., Hampton Institute; M.S., A&T State University; Assistant Professor and Acting Chairperson

Guy Loftin, B.S., A&T State University; M.S., A&T State University; Instructor

James Ramsey, B.S., North Carolina A&T State University; M.S., North Carolina A&T State University; Instructor

COURSES

Undergraduate

- 230 Electricity and Electronics
- 497 Cooperative Training in Industry I
- 498 Cooperative Training in Industry II
- 599 Independent Study

Advanced Undergraduate and Graduate

- 690 Social Problems in Technology

Technical Specialization in Electronics and Computer Technology

- 231 Electronic Communication Circuits
- 234 Electronic Instrumentation
- 430 Industrial Electronics
- 431 Digital Logic Circuits
- 432 Microprocessor
- 433 Video Electronics

SCHOOL OF ENGINEERING

Suresh Chandra, Dean
William J. Craft, Associate Dean

The School of Engineering grants bachelor of science degrees in architectural, chemical, civil, electrical, industrial, and mechanical engineering. The School also offers the master of science degree in engineering, architectural engineering, electrical engineering, industrial engineering and mechanical engineering. The Ph.D. degree is available in most engineering disciplines through an interinstitutional program between North Carolina State University and NC A&T State University.

The programs of study are aimed toward preparing a student for engineering practice in all phases of his chosen field. The specific objectives of the School of Engineering are:

1. To prepare the student for an active career in his chosen discipline within the profession.
2. To provide a comprehensive background in all phases of the engineering design process, namely: conception, planning, synthesis, analysis, design, and management.
3. To provide a basic knowledge of the mathematical and natural sciences upon which the practice of engineering depends.
4. To develop the judgment the engineer requires to utilize effectively, and economically, the materials and forces of nature for the benefit of mankind.
5. To encourage the student to develop an appreciation for the process of continuing education.
6. To develop the intellectual, professional, and social characteristics of the student in such a manner as to enable him to become a responsible leader in the community.

ADMISSION AND MATRICULATION POLICIES

I. Admission Policy

For admission to any engineering program, the applicant must satisfy the standing University admissions policy. In addition, the applicant must have completed Algebra I and II, one unit of geometry and one half unit of trigonometry or equivalent*.

II. Matriculation Policy

1. All engineering students must meet certain prerequisites prior to beginning sophomore level engineering courses required in their chosen major. They must:
 - a. Attain a grade of "C" or better in Math 131.
 - b. Attain a grade of "C" or better in English 100 and English 101.
 - c. Attain a grade of "C" or better in each of the Freshman courses bearing the department or major prefix.
2. Students not meeting requirements for sophomore engineering course eligibility shall be given individual counsel in selecting one of the following options:
 - a. Change major.
 - b. Continue in current status, with a reduced number of credit hours per semester, and/or repeat key courses in math, freshman engineering, etc., before beginning sophomore engineering courses.
 - c. Change major department within the School of Engineering and continue to attempt to fulfill sophomore engineering course eligibility.
3. Individual advice and counseling for students deficient after the freshman year shall be provided by the student's host department.

*Students entering with a deficiency in mathematics or who score low on the Mathematics Placement Examination must begin with Pre-Engineering Mathematics which is not counted towards the required semester hours for graduation. In this case the normal mathematics sequence is shifted one semester.

COOPERATIVE EDUCATION PROGRAM

A cooperative education program, in which students may earn a major portion of their educational expenses through a work-study arrangement with industry, is available to students with satisfactory scholastic records.

After satisfactory completion of at least two semesters in the freshman year, students in engineering, mathematics or physics may alternate semesters in industry with semesters at the University until their senior year. They then remain at the University until graduation. This arrangement enables the student to receive two years of work experience while completing a degree.

REQUIRED SENIOR EXAMINATION

In concert with our faculty's wish to improve the quality of education for our graduates, a senior examination was established in September 1980; it became a graduation requirement in February 1982. An Engineering student should take the senior examination during the first semester of the senior year.

The examination is given each fall semester for May or summer graduates. It is also given each spring semester for December graduates. Usual examination dates are: for the fall test, a Saturday in late October or early November, and for the spring test, a Saturday in early to mid-April. The test date will be posted and announced in class early each semester. After each examination, a list of attendees will be transmitted to the Director of Registration and Records, for inclusion in student files.

Specifically, the senior examination is expected to complement the current educational experiences of our graduates and to help the School monitor its program quality. It will provide each student with a preview of the type of objective test that must be passed by those wishing to become registered engineers and sit for the Engineer-in-Training (EIT) or Fundamentals Examination

(FE). Our examination will also help our students by providing our department chairman with key data in determining areas of the curricula in which change is warranted.

Department of Architectural Engineering

Peter Rojeski, Jr.
Chairperson

OBJECTIVES

It is the aim of the program in architectural engineering to encourage and develop students, who exhibit creative ability and who exhibit the ability to grasp and use scientific principles, for professional careers in the art and science of building design. Strong emphasis is placed on training in the building sciences and on training in engineering as it applies to the design and construction of buildings. Training provided through exposure and involvement with research projects and investigations directed by the architectural engineering faculty is encouraged.

The architectural engineering program provides considerable training in general education which is devoted to study of social and physical sciences, art, English, mathematics and the humanities. Introductory courses in architectural engineering and a large percentage of the required general education courses are scheduled in the freshman and sophomore years. This training, during the first and second years, provides background for the study of basic engineering science and the study of more professional courses which are scheduled later in the program. Instruction within the department of architectural engineering is organized under four divisions.

1. Graphics, Architectural Design and Architectural History
2. Environmental Control, Electrical and Mechanical Equipment of Buildings
3. Professional Practice, Management, Materials & Methods of Construction
4. Structures

Each of these divisions has specific course requirements that are aimed toward the development of the architectural engineering student, so that a graduate will be able to take a place in society as a professional in the field of engineering.

The five year program in architectural engineering leads to the bachelor of science degree and is fully accredited by the Accreditation Board for Engineering and Technology, Inc. (ABET).

DEGREES OFFERED

- Architectural Engineering—B.S.
- *Architectural Engineering—M.S.A.E.
- *Engineering—Structures Concentration—M.S.E.

*See the Graduate School Bulletin

DEPARTMENT DEGREE REQUIREMENTS

See School of Engineering Undergraduate Admission policy statement. For Graduate degree admission requirements see the Graduate School Bulletin.

DEPARTMENTAL REQUIREMENTS

The major in architectural engineering must complete 160 semester hours of University courses. Included in the 160 semester hours are 9 semester hours of architectural engineering courses selected from one of three optional blocks—Structures, Architectural Design and Planning, or Environmental Systems. A minimum cumulative grade point average of 2.00 for all architectural engineering courses completed, and a minimum cumulative grade point average of 2.00 for all courses taken at the University are required for graduation.

ACCREDITATION

The undergraduate program in architectural engineering, leading to the B.S. degree, is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

CAREER OPPORTUNITIES

Completion of the architectural engineering program provides training for a career in the profession of engineering as related to the planning, design and construction of buildings. Training in architectural engineering prepares graduates to pursue a goal of professional practice or business. Graduates are employed in offices of professional engineers engaged in building systems design which include the design of structural, mechanical and electrical systems for buildings. Graduates are employed in the offices of professional architects engaged in planning and in the architectural design of buildings. Architectural engineering graduates have an opportunity for a career with construction firms and building materials manufacturers, where there exist various positions that utilize architectural engineering training.

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN ARCHITECTURAL ENGINEERING

Freshman Year

First Semester

Dept. No.	Course	Cr.
Math	131 Calculus I	4
Eng	100 Ideas & Expr. I	3
Hist	100 World Civil. I	3
AE	111 Intro. to A.E.	2
AE	112 Hist. of Amer. Arch.	3
		15

Second Semester

Dept. No.	Course	Cr.
AE	122 Arch. Graphics	3
Eng	101 Ideas and Expr. II	3
Hist	101 World Civil. II	3
AE	132 Mat. & Method of Const.	3
Math	132 Calculus II	4
		16

Sophomore Year

First Semester

Dept. No.	Course	Cr.
Chem 101	Gen Chem I	3
Chem 111	Gen Chem I Lab	1
Math 231	Calculus III	4
Phys 241	Gen Physics I	4
Phys 251	Gen Physics I Lab	1
AE 221	Plumbing & Fire	3
		<u>16</u>

Second Semester

Dept. No.	Course	Cr.
AE 232	Mat Method II	3
ME 335	Mech I, Statics	3
Phys 242	Gen Phys II	4
Phys 252	Gen Phys II Lab	1
EE 200	Elec Cir Theory	3
EE 206	Elec Cir Theory Lab	1
Art Elective (Humanities)		2
		<u>17</u>

Junior Year

Lower Junior

First Semester

Dept. No.	Course	Cr.
AE 331	Arch Design I	3
AE 311	Computer-Aided	3
AE 321	Thry Structure I	3
ME 336	Strength of Mat	3
ME 346	Strength-Lab	1
Math	Elective	3
		<u>16</u>

Second Semester

Dept. No.	Course	Cr.
AE 332	Arch Design II	3
AE 322	Thry Structures II	3
Econ 301	Economics	3
ME 337	Mech II, Dynamics	3
AE 342	Bldg Ill. Concepts	2
AE 352	Ele Sys for Bldgs	3
		<u>17</u>

Upper Junior

First Semester

Dept. No.	Course	Cr.
AE 461	HVAC principles	3
AE 471	Steel Struct I	3
AE 431	Arch Design III	3
AE 481	Rein Conc Thry	3
	Technical Elective	3
		<u>15</u>

Second Semester

Dept. No.	Course	Cr.
PlSc 309	Geology	3
AE 472	Steel Struct II	3
AE	Option Block	3
	Technical Elective	3
	Technical Elective	3
		<u>15</u>

Senior Year

First Semester

Dept. No.	Course	Cr.
AE 561	Found & Soil	3
AE 551	Prod Drawings	3
	Optional Block	3
	Humanities Elective	3
AE 521	Senior Seminar	1*
AE 510	Engr/Constr Mgmt	2
		<u>15</u>

Second Semester

Dept. No.	Course	Cr.
AE 522	Professional Prac	2
AE 512	Senior Project	3
IE 460	Engr Econ Analysis	2
	Elective (Humanities)	3
	Optional Block	3
	Health/PE Elective	2
		<u>15</u>

Total Hours—160

*Design Option students do not take AE 521.

OPTIONAL BLOCK

STRUCTURES

Dept. No.	Course	Cr.
AE 601	Adv Concrete	3
AE 602	Advanced Struct Analysis	3
AE 602	Foundation Engr	3

DESIGN & PLANNING

Dept. No.	Course	Cr.
AE 620	Arch Design IV	3
AE 621	Adv Architect Design	3
AE 622	City & Urban Design	3

ENVIRONMENTAL

Dept. No.	Course	Cr.
AE 610	Airside System Design	3
AE 611	Hydronic Systems Design	3
AE 612	HVAC Controls	3

The completion of at least nine semester hours from one of the optional block concentrations is required.

DIRECTORY OF FACULTY AND COURSES

Architectural Engineering Department

Peter Rojeski, Jr., P.E., B.S., Clarkson College of Technology; M.S., Cornell University; Ph.D., Cornell University; Associate Professor, Department Chairman

Elias G. Abu-Saba, B.S.M.E., American University of Beirut; M.S.C.E., Virginia Polytechnic Institute; Ph.D., Virginia Polytechnic Institute; Associate Professor

Reginald C. Whitsett, B.S., North Carolina A&T State University; M.S., North Carolina State University; Associate Professor

Harmohindar Singh, P.E., B.Sc., Punjab University; M.Sc., Punjab University; M.S., Wayne State University; Ph.D., Wayne State University; Associate Professor

Ronnie S. Bailey, B.A., Howard University; M.U.P., University of Wisconsin; Assistant Professor

Henry B. Cole, Jr., B.S., North Carolina A&T State University; M.Sc., University of Kansas; Assistant Professor

William Mark McGinley, B.S., University of Alberta; M.S.C.E., University of Alberta; Ph.D.; University of Alberta; Assistant Professor

Arjun D. Kapur; B.S., Punjab University, INDIA; M.E.; McGill University, CANADA; Ph.D., Indian Institute of Technology, Delhi, INDIA; Adjunct Assistant Professor

Architectural Engineering Undergraduate Courses

- 111 Introduction to Architectural Engineering
- 112 History of American Architecture
- 122 Architectural Graphics
- 132 Materials and Methods of Construction I
- 221 Plumbing and Fire Protection
- 232 Materials and Methods of Construction II
- 311 Computer-Aided Analysis
- 321 Theory of Structures I
- 322 Theory of Structures II
- 331 Architectural Design I
- 332 Architectural Design II
- 342 Building Illumination Concepts
- 352 Electrical Systems for Buildings
- 411 History of Contemporary Architecture
- 421 Advanced Design Methods
- 431 Architectural Design III
- 461 HVAC Principles
- 462 HVAC Systems Concepts
- 471 Steel Structures I
- 472 Steel Structures II
- 481 Reinforced Concrete Theory and Design
- 510 Engineering and Construction Management
- 512 Senior Project
- 521 Senior Seminar
- 522 Professional Practice
- 551 Production Drawings
- 561 Foundations and Soils Structures
- 573 Energy Management for Buildings

Undergraduate/Graduate Courses

- 601 Advanced Reinforced Concrete
- 602 Advanced Structural Analysis
- 610 Airside Systems Design Concepts
- 611 Hydronic Systems Design
- 613 Design of Energy Conservation Systems
- 620 Architectural Design IV
- 621 Advanced Architectural Design
- 622 City and Urban Design

Department of Chemical Engineering

Franklin G. King, Chairman

OBJECTIVES

The primary objective of the Department of Chemical Engineering is to provide students with a learning experience that will instill in them a lifelong sense of learning, social responsibility, and commitment to improving the quality of life for all people in North Carolina. The Department seeks to provide an atmosphere of dedicated service to the student by providing counseling, program planning, career guidance, and any other supportive student services to facilitate student growth and success in the academic and professional communities.

The chemical engineering curriculum is designed to provide students with a strong foundation in chemis-

try, physics, and mathematics, with the emphasis gradually shifting toward chemical engineering courses in the junior and senior years. The program provides students with the knowledge to apply basic skills and sound judgment to develop designs for economically for converting materials and energy into useful products for the benefit of our society and culture. The senior design sequence acts as a "capping stone" which coordinates all technical aspects of the chemical engineering curriculum. The social sciences and humanities background is included so the students obtain a well-rounded education.

Specifically, the chemical engineering program strives to develop a sound and broad background in the fundamental areas of chemical engineering and stresses the development of design, analysis and problem solving skills. The program is intended to prepare students to enter the chemical engineering profession or to continue their education towards an advanced degree.

DEGREES OFFERED

Chemical Engineering—B.S.
Ch.E.

*Engineering—Chemical Engineering Concentration—M.S.E.

**See Graduate School Bulletin*

GENERAL PROGRAM REQUIREMENTS

See School of Engineering Undergraduate Admission policy statement. For graduate degree admission requirements see the Graduate School Bulletin.

DEPARTMENTAL REQUIREMENTS

The chemical engineering major must complete 134 credit hours following the approved departmental curriculum. Majors must also satisfy all University and School of Engineering requirements. At the beginning of the senior year the student must select one of the chemical engineering option blocks from which he/she must select three (3) electives.

The chemical engineering major must maintain a 2.0 average overall and a 2.0 average in chemical engineering courses. In addition, a minimum grade of "C" must be achieved in six selected chemical engineering courses (100, 110, 200, 210, 300, and 320).

CAREER OPPORTUNITIES

Chemical engineers have a broad enough background to do almost anything they choose. All branches of engineering emphasize the application of principles of mathematics and physics to solve problems and to create products for the community at large. Chemical engineers however, are unique in emphasizing applications which are also founded in chemistry. Chemical engineers are primarily concerned with processes and equipment in which material changes in composition or state. The traditional chemical engineer often becomes employed by a company which manufactures a variety of chemical products including plastics, forest products, gasoline, food, textile fibers, and pharmaceuticals. The assignment given to chemical engineers can be highly diverse, ranging from design, construction, operations research, and product development to technical sales and management. A career in chemical engineering is often a route to top management.

More recently, chemical engineers are finding opportunities in the fabrication of microelectronic devices, in the conversion of coal to fuels, in the control of industrial and municipal wastes, and in the application of biological science to produce chemicals from biomass through genetic engineering.

In addition to the industrial opportunities that await chemical engineering graduates, opportunities exist for graduate study in engineering as well as such diverse areas as medicine, law, business and biotechnology. In view of the many options open to its graduates, chemical engineering can be a particularly good choice for students who have broad interests, but have not yet defined their career objectives.

The future prospects for chemical engineering are also very bright. As our society becomes more complex, there will be a growing need to get the most out of the limited supplies of natural resources. Chemical engineers will be in demand to find solutions to problems arising from production of energy and chemicals from renewable resources and for the efficient utilization of available resources.

The chemical engineering curriculum is designed to give students the knowledge and scientific tools needed to prepare them for a career in industry or to go on to graduate school. It is also intended to be flexible enough to accommodate a broad range of educational interests. Sufficient electives have been provided so that a student can select a senior area option based on their interests.

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN CHEMICAL ENGINEERING

Freshman Year

First Semester

Dept. No.	Course	Cr.
ChE 100	Intro to Chem Eng'g	1
Chem 106	General Chemistry VI	3
Chem 116	General Chemistry VI Lab	2
Engl 100	Ideas & Expression I	3
Math 131	Calculus I	4
	Elective (SS/H)	3
		16

Second Semester

Dept. No.	Course	Cr.
ChE 110	Intro to Chem Eng'g Design	2
Chem 107	General Chemistry VII	3
Phys 241	General Physics I	4
Phys 251	General Physics I Lab	1
Engl 101	Ideas & Expression II	3
Math 132	Calculus II	4
		17

Sophomore Year

First Semester

Dept. No.	Course	Cr.
ChE 200	Chem Process Principles I	3
Chem 221	Organic Chemistry I	3
Chem 223	Organic Chemistry I Lab	2
Phys 242	General Physics II	4
Phys 252	General Physics II Lab	1
Math 231	Calculus III	4
		17

Second Semester

Dept. No.	Course	Cr.
ChE 210	Chem Process Principles II	3
ChE 220	Chem Engineering Analysis	3
Chem 222	Organic Chemistry II	3
ME 335	Mechanics I, Statics	3
	Elective (SS/H)	3
	Elective (SS/H)	3
		18

Junior Year

First Semester

Dept. No.	Course	Cr.
ChE 300	Transport Operations I	3
ChE 310	Chem Eng'g Thermodynamics	3
Chem 441	Physical Chemistry I	3
Math 331	Applied Math I	3
EE 200	Electric Circuit Analysis	3
EE 336	Strength of Materials	3
		18

Second Semester

Dept. No.	Course	Cr.
ChE 320	Transport Operations II	3
ChE 330	Chem Engineering Lab I	2
ChE 340	Process Dynamics & Control	3
Chem 442	Physical Chemistry II	3
Chem 443	Physical Chemistry I Lab	1
EE 442	Electrical Eng. Survey	3
	Elective (SS/H)	3
		18

Senior Year

First Semester

Dept. No.	Course	Cr.
ChE 400	Mass Transfer Operations	3
ChE 410	Chem Engineering Lab II	2
ChE 420	Chem Reaction Engineering	3
ChE 430	Process Design I	3
ChE 500	Seminar	0
Chem 444	Physical Chem Lab II	1
	Elective (ChE Option)	3
		15

Second Semester

Dept. No.	Course	Cr.
ChE 440	Process Design II	3
ChE 500	Seminar	0
	Elective (ChE Option)	3
	Elective (ChE Option)	3
	Elective (SS/H)	3
	Elective (SS/H)	3
		15

Curriculum Total — 134 credits

CHEMICAL ENGINEERING ELECTIVE PACKAGE

The chemical engineering program has a total of 10 elective courses. The courses must be distributed in the two areas as discussed below:

I. Chemical Engineering Option Electives (3 Courses)

These upper level technical electives are generally taken in the senior year. A minimum of two chemical engineering courses must be taken from one of the option blocks offered within the department. The third course can be subject to department approval, (generally from chemistry, mathematics or engineering) to support the option selected. The department plans to offer option blocks in at least the following areas:

- A. Advanced Chemical Engineering
- B. Biotechnology
- C. Microelectronic device fabrication

II. Social Sciences and Humanities Electives (6 Courses)

All six courses must be taken from the approved list of social sciences (SS) or humanities (H) electives. The SS/H electives are to be selected so that at least one course is at an advanced level and three courses should be related so that an area of concentration can be developed (e.g. 3 courses in sociology). The SS/H package will be selected in consultation with the advisor and approved by the department chairperson. In addition, at least two courses must be from each area (SS or H). Students selecting SS/H courses with less than 3 credits will have their entire SS/H elective package evaluated to assure that their program meets ABET criteria.

DIRECTORY OF CHEMICAL ENGINEERING FACULTY AND COURSES

Tevfik Bardakci, B.S., University of Ankara; M.S. University of Maryland; Ph.D., University of Maryland; Associate Professor.

Timothy L. Faley, B.S., University of Illinois; M.S., Ph.D., University of Notre Dame; Assistant Professor.

Vinayak N. Kabadi, B.ChE., Bombay University; M.S., S.U.N.Y. at Buffalo; Ph.D., Pennsylvania State University; Assistant Professor

Franklin G. King, B.S., Pennsylvania State University; M.S., Kansas State University; M.Ed., Howard University; D.Sc., Stevens Institute of Technology; Professor and Chairman.

Li Ting, B.E., Chung-Yaun University; M.E., University of Detroit; Ph.D., Illinois Institute of Technology; Assistant Professor.

Chemical Engineering Undergraduate Courses

- 100 Introduction to Chemical Engineering
- 110 Introduction to Chemical Engineering Design
- 200 Chemical Engineering Principles I
- 210 Chemical Engineering Principles II
- 220 Chemical Engineering Analysis
- 300 Transport Operations I
- 310 Chemical Engineering Thermodynamics
- 320 Transport Operations II
- 330 Chemical Engineering Laboratory I
- 340 Process Dynamics and Control
- 400 Mass Transfer Operations
- 410 Chemical Engineering Laboratory II
- 420 Chemical Reaction Engineering
- 430 Process Design I
- 440 Process Design II
- 500 Chemical Engineering Seminar
- 505 Selected Topics in Chemical Engineering

- 510 Independent Study in Chemical Engineering
- 520 Fuels and Petrochemicals
- 525 Fuels and Synfuels Process Design
- 530 Basic Food Processing Engineering
- 535 Food Processing Design
- 540 Forest Products Engineering
- 545 Forest Product Chemical Design

Undergraduate/Graduate Courses

- 600 Advanced Process Control
- 605 Biochemical Engineering
- 610 Advanced Chemical Engineering Thermodynamics
- 620 Advanced Chemical Engineering Analysis
- 630 Transport Phenomena
- 650 Interfacial and Membrane Phenomena

Department of Civil Engineering

Kenneth H. Murray, Chairperson

OBJECTIVES

The civil engineering program is comprised of a core curriculum for all of its students and upper level specialization options in environmental and water resources, transportation and materials, and geotechnical studies. These upper level options provide the bulk of the design content.

The educational objectives of the program are:

- (1) To provide an educational program in support of professional careers in fields of Civil Engineering important to the industrialization and environmental protection of North Carolina;

- (2) To provide an undergraduate educational program that will prepare students for graduate studies in civil, transportation, environmental, protection and water resources engineering.

DEGREES OFFERED

Civil Engineering—BSCE
Engineering*—Civil Engineering
Concentration
M.S.E.

*See Graduate School Bulletin.

GENERAL PROGRAM REQUIREMENTS

See School of Engineering Undergraduate Admission Policy statement.

DEPARTMENTAL REQUIREMENTS

The Civil Engineering Major must complete the required 133 hour curriculum selecting one of the senior options. In addition, the student must have a 2.00 cumulative courses. A minimum grade of "C" in all Civil Engineering courses is also required for graduation.

CAREER OPPORTUNITIES

Civil engineers are employed in the planning, designing and construction of transportation, environmental, water resources, geotechnical and structural systems. They may work in private practice, government, and industry. Many civil engineers are licensed as professional engineers in the state in which they practice. Some civil engineers are employed in university teaching and in research which usually requires an advanced degree. Civil engineers are in demand in construction, transportation and government and B.S. degree holders in Civil Engineering generally receive higher starting salaries than their counterparts in other schools.

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN CIVIL ENGINEERING

The sample program that follows is designed to meet accreditation guidelines and usually cannot be changed; however, special cases can be approved by the chairman.

Freshman Year

First Semester

Dept. No.	Course	Cr.
Math 131	Calculus I	4
Hist 100	World Civ. I (1)	3
CE 101	Intro to Civil Engr	2
Eng 100	Ideas & Express I	3
Chem 101	Gen. Chemistry I	3
Chem 111	Gen. Chemistry I Lab	1
		16

Second Semester

Dept. No.	Course	Cr.
CE 202	Computer Ap & Gra II	2
Math 231	Calculus III	4
Phys 241	Gen Physics I	4
Phys 251	Gen Physics I Lab	1
IE 320	Engr. Statistics (3)	3
Math 350	or Lin Alg Matrix (3)	3
Econ 301	Prin. Marco Econ	3
		17

Sophomore Year

First Semester

Dept. No.	Course	Cr.
EE 200	Basic Elec Engr	3
CE 310	Environmental Engr	2
CE 311	Envirto Engr Lab	4
CE 360	Hydrology	3
ME 337	Dynamics	3
ME 336	Strength of Materials	3
ME 346	Materials Testing Lab	1
		16

Second Semester

Dept. No.	Course	Cr.
ME 441	Thermodynamics I	3
CE	Struct Design Elect (4)	3
CE	CE Design Elect (5)	3
CE	CE Design Elect (5)	3
CE 410	Water and Waste Water	3
Hum 200	Humanities I (2)	3
		18

Junior Year

First Semester

Dept. No.	Course	Cr.
Math 132	Calculus II	4
ME 103	Intro to Graphics	2
CE 200	Computer Ap & Gra I	2
Engl 101	Ideas and Express II	3
Chem 102	Gen Chemistry II	3
Hist 101	World Civil. II (1)	3
		17

Second Semester

Dept. No.	Course	Cr.
ME 335	Statics I	3
CE 204	Surveying	2
CE 330	Const. Materials	2
CE 331	Const. Materials Lab	1
IE 460	Engr. Economy	2
Phys 242	Gen Phys II	4
Phys 252	Gen Phys II Lab	1
	Social Sci Elect. (6)	3
		18

Senior Year

First Semester

Dept. No.	Course	Cr.
CE 350	Transpo Engr	3
CE 340	Theo of Structures I	3
CE 320	Geotech. Engr I	2
CE 321	Geotech. Engr I Lab	1
ME 416	Fluid Mech	3
ME 426	Fluid Mech Lab	1
EE 442	Basic Elec Engr II	3
		16

Second Semester

Dept. No.	Course	Cr.
CE 400	CE Systems	3
CE	CE Design Elect (5)	3
CE	CE Elect (5)	3
CE	CE Design Elect (5)	3
Hum 201	Humanities II (2)	3
		15

Total hours 133

Notes:

1. Other courses in the social science area may be substituted upon advisor approval, if they fit into a well conceived plan.
2. Other courses in the humanities area may be substituted upon advisor approval, if they fit into a well conceived plan.
3. Students electing the Geotechnical Option should select Math 350. Students electing the Environmental or Transportation and Materials Options should select IE 320.
4. Students must select a structural design course from the following CE 342, CE 344 or CE 346.
5. Students must select senior year option courses defined in the "Senior Options".
6. This elective must not be a entry level course.

CIVIL ENGINEERING SENIOR OPTIONS

The senior year in the Civil Engineering Program contains five elective courses which must be selected by the student from the following options. Each option gives the student advance study in the area of Civil Engineering. Students are advised to select their electives from one option area, but may after consultation with their advisor, choose courses from two option areas. The selected set of electives must contain 7 hours of design content. The design content of each elective course is given in parenthesis following the total hour credits for the course. The courses designated with and * are available for graduate credit.

ENVIRONMENTAL AND WATER RESOURCES OPTION

450-416	Solid Wastes Management	
450-460	Water Resources Engineering	
450-464	Applied Hydraulics	
*450-610	Water and Wastewater Analysis	
*450-612	Environmental Engineering Design	
*450-614	Stream Water Quality Modeling	
*450-618	Air Pollution Control	

GEOTECHNICAL OPTION

450-342	Reinforced Concrete Design	3 (2)
450-420	Geotechnical Engineering II	3 (2)
450-440	Structural Analysis II	3
450-480	Construction Engineering	3 (2)
450-522	Foundation Design	3 (2)
*450-622	Design of Earth Structures	3 (2)
*450-644	Finite Element Analysis I	3 (1)

TRANSPORTATION AND MATERIALS OPTION

450-342	Reinforced Concrete Design	3 (2)
450-450	Transportation Engineering II	3 (2)
450-452	Bituminous Materials and Mixture Design	2 (1)
450-453	Bituminous Materials Laboratory	1 (½)
450-454	Portland Cement Materials and Mix Design	2 (1)
450-455	Portland Cement Materials Laboratory	1 (½)
450-480	Construction Engineering	3 (2)
450-522	Foundation Design	3 (2)
*450-642	Prestressed Concrete Theory and Design	3 (2)

DIRECTORY OF FACULTY

Kenneth H. Murray, B.S., M.S., Ph.D., Virginia Polytechnic Institute and State University; Professor and Chairman (P.E.)
Shoou-Yuh Chang, B.S., M.S., National Taiwan University; M.S., University of North Carolina at Chapel Hill; Ph.D., University of Illinois at Urbana-Champaign; Associate Professor (PE)
M. Reza Salami, B.S., M.E., Virginia Polytechnic Institute and State University; Ph.D., University of Arizona; Assistant Professor (EIT)
Gary S. Spring, B.S., M.S., Ph.D., University of Massachusetts at Amherst; Assistant Professor (PE)

Department of Electrical Engineering

Harold L. Martin,
Chairperson

OBJECTIVES

The objectives of the Department of Electrical Engineering are to provide the opportunity for its students to acquire the educational background necessary to pursue professional careers in electrical engineering or to continue their education toward advanced degrees. The primary purpose of the department is to teach technical arts and sciences related to the field of electrical and computer engineering.

DEGREE OFFERED

Electrical Engineering—B.S.
*Electrical Engineering—M.S.

**See the Graduate School Bulletin.*

GENERAL PROGRAM REQUIREMENTS

The admission of students to the B.S. degree program in Electrical Engineering is based upon the general admission requirements of the University. In addition, two units of algebra, one unit of plane geometry and one half unit of trigonometry are required.

The requirements for unconditional admission to the M.S. degree program in Electrical Engineering are an undergraduate engineering degree from an ABET accredited program with a minimum overall average of 3.0 (See Graduate School Bulletin for more details.)

DEPARTMENT DEGREE REQUIREMENTS

Electrical Engineering Major (B.S. degree)—The major in electrical engineering must complete a minimum of 130 credit hours for the Bachelor of Science Degree. Included in the 130 semester hours are 44 hours of electrical engineering, 9 hours of mechanical engineering, 2 hours of industrial engineering, 8 hours of advanced engineering electives, 21 hours of mathematics, 20 hours of basic sciences and 24 hours of social sciences and humanities. A minimum grade of "C" must be achieved in all electrical engineering courses.

While changes in requirements for the B.S. degree may occur at anytime, a student is given the option of graduating under the curriculum in force when the student entered the program or graduating under the new program.

ACCREDITATION

The undergraduate program in electrical engineering, leading to the B.S. degree, is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

CAREER OPPORTUNITIES

A degree in this field prepares a student for careers in Computer Engineering, Engineering Design, Electronics, Communications, Power Engineering and Signal Processing, or for graduate study in electrical or computer engineering.

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN ELECTRICAL ENGINEERING

Bachelor of Science

Freshman Year

<i>First Semester</i>	Credit
Engl 100 Fresh Comp I	3
Math 131 Calculus I	4
EE 100 Comp. Methods I	3
Hist 100 World Civ. I	3
	15

<i>Second Semester</i>	Credit
Engl 101 Fresh Comp II	3
Math 132 Calculus II	4
Chem. 101	3
Chem. 111	1
EE 101 Intro. to EE	3
Hist 101 World Civ. II	3
	17

Sophomore Year

<i>First Semester</i>	Credit
Math 231 Calculus III	4
Phys 241 Gen. Phys. I	4
Phys 251 Gen Phys I Lab	1
EE 200 E Ckt Anal I	3
EE 206 Circuits Lab I	1
ME 335 Mech I, Statics	3
	16

<i>Second Semester</i>	Credit
Math 331 Intro Appl Math I	3
Phys 242 Gen Phys II	4
Phys 252 Gen Phys II Lab	1
EE 300 E Ckt Anal II	3
EE 306 E Ckt Anal II Lab	1
ME 337 Mech II, Dynam	3
EE 327 Digital Logic	2
	17

Junior Year

<i>First Semester</i>	Credit
Math 225-332 Intro Appl Math II	3
EE 320 Electronics I	3
EE 326 Electronics Lab I	1
EE 427 Intro to Microproc	3
EE 433 Digital Sys Lab	1
EE 400 Dig Sig Anal & Proc	3
IE 460 Eng Econ Anal	2
	16

<i>Second Semester</i>	Credit
EE 325 Prin EM Waves	3
EE 4x0 EE Elective I	3
EE 460 Electronics II	3
EE 466 Electronics Lab II	1
ME 441 Thermo I	3
Advance Math Elec.	3
	16

Senior Year

<i>First Semester</i>	Credit
EE 430 Power Systems	3
EE 436 Power Systems Lab	1
EE 4x0 EE Electives II	3
Phys 406 Modern Phys	3
Econ 300 Economics I	3
Adv Eng Lab	3
	16

<i>Second Semester</i>	Credit
Advanced Eng Electives	3
Adv. Eng Lab	2
Soc Sci Electives	9
Basic Sci Electives	3
Free Electives	2
	19

Total hours 130

EE Electives I

420-410 Linear Sys & Ctrl
420-420 Power Electronics

EE Electives II

420-450 Prin of EM Waves II
420-470 Properties of Materials for EE

DIRECTORY OF FACULTY AND COURSES

Electrical Engineering

Ali Abul-Fadl, B.S., M.S., Ph.D., University of Idaho; Associate Professor
Ward J. Collis, B.S., M.S., Northwestern University; Ph.D., Ohio State University; Associate Professor
Shanthi Iyer, B.S., M.S., Delhi University; Ph.D., Indian Institute of Technology; Assistant Professor
Jung Kim, B.S., Yonsei University, M.S., Ph.D., North Carolina State University; Assistant Professor
Young Kim, B.S., Seoul National University, M.S., Korea Advanced Institute of Science/Technology, Ph.D., Ohio State University; Adjunct Assistant Professor.
Ashok Kumar, B.S., Allahabad University, M.S., University of Roorkee, Ph.D., University of Calgary; Assistant Professor.

Gary Lebby, B.S., M.S., (Physics), University of South Carolina, Ph.D., Clemson University; Assistant Professor.
Harold L. Martin, B.S., M.S., North Carolina A & T State University; Ph.D., Virginia Polytechnic Institute and State University; Associate Professor (PE) and Chairperson
David Olson, B.S., M.E., Michigan Technological University; Ph.D., University of Utah; Associate Professor
Earnest E. Sherrod, B.S., North Carolina A & T State University; M.S., Newark College of Engineering; Assistant Professor
Raphael Tsu, B.S., University of Dayton; M.S., Ph.D., Ohio State University; Professor
Leo Williams, Jr., B.S., M.S., University of Illinois; Professor (PE)
Chung Yu, B.Eng., McGill University; M.S., Ph.D., Ohio State University; Professor
Dr. Chang N. Zhang, B.S., (Math and C.S.), Shanghai University of Science and Technology, Ph.D., Southern Methodist University; Adjunct Assistant Professor.

List of Courses

100 Computational Methods I
101 Introduction to Electrical Engineering
200 Electric Circuit Analysis
206 Circuits Laboratory I
300 Electric Circuit Analysis and Synthesis
306 Circuits Laboratory II
320 Electronics I
326 Electronics I Laboratory
325 Principles of Electromagnetic Waves
327 Digital Logic
400 Digital Signal Analysis and Processing
410 Linear Systems and Control
427 Introduction to Microprocessors
430 Power Systems, Energy Conversion and Electric Machinery
433 Introduction to Logic Design Laboratory
436 Power Systems, Energy Conversion and Electric Machinery Laboratory
442 Survey of Electrical Engineering
450 Electromagnetic Radiation and Microwave Theory
460 Electronics II
466 Electronics II Laboratory
470 Properties of Materials for Electrical Engineering

Undergraduate/Graduate Courses

- 602 Semiconductor Theory & Devices
- 614 Integrated Circuit Fabrication Methods
- 615 Silicon Device Fabrication Laboratory
- 616 Microprocessors Software Design
- 617 Microprocessor Hardware Design
- 619 Microprocessor Laboratory
- 627 Switching Theory
- 629 VLSI Design
- 630 VLSI Design Laboratory
- 633 Digital Electronics
- 636 Power Systems Analysis I
- 637 Power Systems Analysis II
- 642 Solid State Energy Conversion
- 649 Modulation Theory and Communication Systems
- 650 Digital Signal Processing I
- 651 Digital Signal Processing Laboratory
- 656 Probability and Random Processing
- 660 Selected Topics in Engineering
- 666 Special Projects
- 668 Automatic Control Theory
- 672 Analog Electronics
- 674 Network Synthesis
- 678 Projects in Electronic Network and Systems

Course descriptions are available upon request from the Dean of the School.

Department of Industrial Engineering

Arup K. Mallik, Chairperson

OBJECTIVES

The main objective of the Industrial Engineering Department is to provide quality education programs leading to the Bachelor's and Master's degrees. Our curriculum is designed to educate professional engineers needed to fill technical and/or managerial positions in manufacturing and service industries, government and private practice.

The Department of Industrial Engineering offers a program of

study which emphasizes a solid general engineering and humanistic background. To this background major courses in Industrial Engineering are added which integrate the use of the computer to aid in the solution of problems. Another major factor in Industrial Engineering is to blend the human element into the total system. The curriculum focuses more attention on the man-machine interface than other engineering fields. Additionally, principles of business, economics and accounting are blended into the curriculum to provide a base for our graduates to progress into management.

The Institute of Industrial Engineers defines the discipline as follows:

Industrial engineering is concerned with the design, improvement, and installation of integrated systems of people, materials, information, equipment and energy. It draws upon specialized knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the results to be obtained from such systems.

DEGREES OFFERED

- Industrial Engineering—B.S.I.E.
- *Industrial Engineering—M.S.I.E.
- *Engineering—Industrial Engineering Concentration—MSE

**See the Graduate School Bulletin.*

GENERAL PROGRAM REQUIREMENTS

See School of Engineering Undergraduate Admission policy statement. For graduate degree admission requirements see the Graduate School Bulletin.

DEPARTMENTAL REQUIREMENTS

A total of 132 semester hours credit are required for graduation. There are 108 hours of specific required courses. Additionally, there are 12 hours of humanities electives, 9 hours of technical electives and 3 hours of free electives. Course substitutions for the 108

hours of specific required courses must be approved by the students' advisor and department chairman.

A minimum grade of "C" must be achieved in all required industrial engineering courses.

ACCREDITATION

The undergraduate program in Industrial Engineering, leading to the BSIE degree, is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

CAREER OPPORTUNITIES

Industrial Engineering is one of the major engineering fields in the United States. Of all engineering fields, industrial engineering represents the engineering field with the greatest unmet need. At present, the number of industrial engineering graduates produced each year represents one-third of the demand for industrial engineering graduates nationally. Starting salaries for industrial engineers are equal to those of the other leading starting salary careers of electrical, mechanical and chemical engineering. The education industrial engineers receive and the type of experience they gain in industry, they very often switch to management careers five to ten years following graduation. Because of the volume of manufacturing and service organizations in North Carolina, and surrounding states as well, there is a considerable demand for industrial engineers.

SUGGESTED CURRICULUM GUIDE FOR A MAJOR IN INDUSTRIAL ENGINEERING

Freshman Year

First Semester

Dept.	No.	Course	Cr.
Eng	100	Comp I	3
IE	101	Interface to IE	2
IE	102	Computer Programming for IE	3
Math	131	Calculus I	4
ME	103	Graphics	2
IE	150	Inter to IE	3
			17

Second Semester

Dept.	No.	Course
Eng	101	Comp II
Math	132	Calculus II
Acct	221	Accounting I
		Humanities Elective
Chem	101	Gen Chem I
Chem	111	Gen Chem I Lab

Dept.	No.	Course	Cr.
IE	530	Production Planning & Control	4
ME	336	Strength of Materials	3
EE	442	Elec Engr II	3
IE	510	Quality Control	3
IE	565	Industrial Ergonomics	3
			16

Sophomore Year

First Semester

Dept.	No.	Course
Phys	241	Gen Phys I
Phys	251	Gen Phys I Lab
Math	231	Calculus III
IE	320	Engr Stat
Econ	300	Micro Econ
ME	226	Mfg Processes
ME	236	Mfg Processes Lab

Senior Year

First Semester

Dept.	No.	Course	Cr.
IE	550	Facilities Planning & Design	3
		Tech Elec	3
ME	441	Thermodynamics I	3
ME	337	Dynamics	3
IE	515	Stoch. Proc. & Simulation	3
			15

Second Semester

Dept.	No.	Course	Cr.
IE	555	Design Projects in IE	3
		Tech Elec	6
		Free Elec	3
		Humanities Elective	3
			15

Second Semester

Dept.	No.	Course
Phys	242	Gen Phys II
Phys	252	Gen Phys II Lab
ME	360	Matl Sci
IE	410	Methds Engr
Econ	301	Macro Econ
		Humanities Elective

Cr.
4
1
3
3
3
3
17

DIRECTORY OF FACULTY AND COURSES

Industrial Engineering

Chen, Chin-Sheng, B.S., M.Ed., National Taiwan Normal University; Ph.D., Virginia Polytechnic Institute and State University; Assistant Professor

Deeb, Joseph, BSIE, MSIE, State University of New York; Ph.D. Candidate, State University of New York; Assistant Professor

Mallik, Arup, BSME, Jadavpur University; MSIE, Ph.D., North Carolina State University; Professional Engineer; Professor

Ntuen, Celestine, NCE, CRS University; BSIE, MSIE, Ph.D., West Virginia University; Assistant Professor

Park, Eui, B.S., Yonsei University; MSIE, Ph.D., Mississippi State University; Associate Professor

Ram, B., BSME, MSIE, Indian Institute of Technology, Madras; Ph.D., State University of New York; Associate Professor

Sarin, S., BSChE, MSIE, Indian Institute of Technology, Delhi; Ph.D., State University of New York; Assistant Professor

List of Courses

Undergraduate

- 101 Interface to Industrial Engineering
- 102 Computer Programming for IE
- 150 Introduction to Industrial Engineering
- 210 Computational Methods in Engineering
- 320 Engineering Statistics
- 410 Methods Engineering
- 465 Engineering Economic Analysis
- 460 Engineering Economy
- 480 Operations Research I
- 510 Quality Control
- 515 Stochastic Proc. & Simulation
- 530 Production Control
- 550 Facilities Planning and Design
- 555 Design Projects in Industrial Engineering
- 565 Industrial Ergonomics

Advanced Undergraduate and Graduate Courses

- 615 Industrial Simulation
- 621 Engineering Cost Control and Analysis
- 624 Production Systems
- 625 Information Systems
- 626 Systems Analysis and Design
- 632 Robotic Systems and Applications
- 640 Intermediate Engineering Economy
- 649 A Survey of Operations Research Methodologies
- 650 Operations Research II
- 658 Project Management and Scheduling
- 660 Selected Topics in Engineering
- 662 Reliability
- 664 Safety Engineering



- 665 Man Machine Systems
- 666 Special Projects
- 678 Engineering Management

Graduate Courses

- 712 Work Measurement Theory
- 716 Engineering Statistics II
- 718 Advanced Quality Control
- 730 Industrial Dynamics
- 733 Advanced Operations Research
- 735 Human-Computer Interface
- 740 Decision Support Systems
- 745 Manufacturing Automation
- 749 Inventory Systems Analysis and Design
- 777 Thesis
- 778 Research
- 789 Special Topics

Course descriptions are available upon request from the Dean of the School.

UNDERGRADUATE CURRICULUM ELECTIVES LIST

See the department's undergraduate curriculum handbook for approved technical, humanities and free electives lists.

Department of Mechanical Engineering

D. Yogi Goswami,
Acting Chairperson

OBJECTIVES

The Department of Mechanical Engineering seeks to prepare students with a comprehensive background in mathematics, physical and social sciences, and the humanities (including communication skills) in addition to a thorough grounding in engineering fundamentals and mechanical engineering specialties (including design and computer proficiency). These graduates should be competent in the engineering techniques related to the planning, design, analysis and synthesis required in the implementation of mechanical engineering projects.

DEGREES OFFERED

- Mechanical Engineering—
B.S.M.E.
- *Mechanical Engineering—
M.S.M.E.
- *Engineering—Mechanical
Engineering Concentration—
M.S.E.

**See the Graduate School Bulletin*

GENERAL PROGRAM REQUIREMENTS

See School of Engineering Undergraduate Admission policy statement. For Graduate degree admission requirements see the Graduate School Bulletin.

DEPARTMENTAL REQUIREMENTS

The Mechanical Engineering Major must complete 135 credit hours following the approved departmental curriculum. A student must choose the technical elective courses out of the approved list of technical electives.

A minimum grade of "C" must be achieved in all mechanical engineering courses.

ACCREDITATION

The undergraduate program in mechanical engineering, leading to the B.S. degree, is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

CAREER OPPORTUNITIES

The Mechanical Engineering Program is to provide the students with quality education that will allow immediate entry into industry, government, private practice or graduate work. By far the largest proportion of graduates take jobs with private industry. Such jobs can be classified under the following general headings: Design, Testing, Development, Production, Research, Technical Marketing, Technical Management and Sales. Career opportunities are possibly the most diverse of any engineering discipline.

CURRICULUM FOR A MAJOR IN MECHANICAL ENGINEERING

Freshman Year

First Semester

Dept. No.	Course	Cr.
Eng 100	Ideas and Expressions I	3
Hist	Elective	3
Math 131	Calculus I	4
ME 100	Mech Engrg Orientation and Anal	2
ME 103	Graphics in Engrg Design	2
Soc. Science	Elective	3
		17

Second Semester

Dept. No.	Course	Cr.
Eng 101	Ideas and Expressions II	3
Hist	Elective	3
Math 132	Calculus II	4
ME 105	Comp Methods in Mech Engrng	2
Chem 101	Gen Chemistry I	3
Chem 111	Gen Chemistry I Lab	1
Health/PE	Elective	1
		17

Sophomore Year

First Semester

Dept. No.	Course	Cr.
Phys 241	General Physics I	4
Phys 251	General Physics I Lab	1
Math 231	Calculus III	4
ME 210	Numerical Meth in Mech Engrg	2
ME 226	Manufacturing Processes	2
ME 236	Manufacturing Processes Lab	1
Humanities	Elective	3
		17

Second Semester

Dept. No.	Course	Cr.
Phys 242	General Physics II	4
Phys 252	General Physics II Lab	1
Economics	Elective	3
Math 331	Intro to Applied Math I	3
ME 335	Mechanics I, Statics	3
ME 360	Material Science	3
		17

Junior Year

First Semester

Dept. No.	Course	Cr.
Math 332	Intro to Applied Math II	3
EE 200	Electrical Circuits Analysis	3
EE 206	Circuits Lab I	1
ME 336	Strength of Materials	3
ME 337	Mechanics II, Dynamics	3
ME 346	Material Testing Laboratory	1
ME 441	Thermodynamics I	3
		17

Second Semester

Dept. No.	Course	Cr.
ME 416	Fluid Mechanics	3
ME 426	Fluid Mechanics Lab	1
ME 440	Mechanism Design and Analysis	3
EE 442	Electrical Engrg Survey	3
ME 442	Thermodynamics II	3
ME 474	Engineering Design	3
Health/PE	Elective	1
		17

Senior Year

First Semester

Dept. No.	Course	Cr.
IE 460	Engrg Economic Analysis	2
ME 560	Modern Engrg Materials	3
ME 562	Heat Transfer	4
ME 564	Machine Design I	3
ME 569	Engrg Materials Laboratory	1
ME 579	Thermal Science Lab	1
Technical Elective		3
		17

Second Semester

Dept. No.	Course	Cr.
ME 565	Machine Design II	3
ME 566	Design of Thermal Systems	3
ME 574	Mechanical Systems Design	4
Humanities Elective		3
Technical Elective		3
		16

TECHNICAL ELECTIVES

All M.E. majors are required to take two technical electives to be chosen from the following list. Each of these electives has 3 credit hours containing 2 credit hours of Engineering Science and 1 credit hour of Engineering Design content.

Dept. No.	Course	Cr.
ME 563	Energy Conversion System Design	
ME 567	Environmental Control	
ME 571	Turbomachinery	
ME 612	Modern Composite Materials	
ME 614	Engineering Modeling	
ME 619	Computer Aided Graphics and Design	
ME 646	Advanced Manufacturing Processes	
ME 647	Advanced Mechanism Design	
ME 650	Mechanical Properties and Structure of Solids	

DIRECTORY OF FACULTY AND COURSES

Mechanical Engineering

Vishnu Sarma Avva (Avva V. Sharma), B.S., Saugor University; D.M.I.T., Madras Institute of Technology; M.S., Oklahoma State University; Ph.D., Pennsylvania State University; Professor

David L. Carmon, B.S., NC A&T State University; M.S. Rutgers University; Adjunct Instructor

Suresh Chandra, B.Sc., Allahabad University; B.Sc. (Ch.E.), Banaras Hindu University; M.Ch.E., University of Louisville; Ph.D., Colorado State University; Professor and Dean

Rajinder S. Chauhan, B.S., G. N. Engineering College; M. Tech., Indian Institute of Technology;

Ph.D., Auburn University; Assistant Professor

William J. Craft, B.S., North Carolina State University; M.S., Ph.D., Clemson University; Professor and Associate Dean (P.E.)

Behrooz Fallahi, B.S., Shiraz University, M.S., Associate Professor, Purdue University, Ph.D.

George J. Filatovs, B.S., Washington University at St. Louis; Ph.D., University of Missouri at Rolla; Professor

A. Googerdy, B.S., Pars College; M.S., Ph.D., Tennessee Tech. University; Assistant Professor

D. Y. Goswami, B.S., Delhi University; M.S., Ph.D., Auburn University; Professor (P.E.) and Acting Chairman.

Ajit D. Kelkar, B.S., Poona University; M.S., South Dakota State University; Ph.D., Old Dominion University; Assistant Professor.

David E. Klett, B.S., Michigan State University; M.S., Ph.D., University of Florida; Professor (P.E.)

Jerzy Klimkowski, M.S., Technical University of Warsaw; Ph.D., Virginia Polytechnical Institute and State University, Assistant Professor

H. Y. Lai, B.S., Cheng Kung University; M.S., State University of New York-Buffalo; Ph.D., University of Wisconsin; Assistant Professor

Tony C. Min, B.S., Chiao Tung University-Shanghai; M.S., University of Tennessee; Ph.D., University of Tennessee; Professor (P.E.)

S. P. Owusu-Ofori, B.S., University of Science and Technology; M.S., Bradley University; Ph.D., University of Wisconsin; Associate Professor

Devdas M. Pai, B. Tech., I.I.T., Madras, India; M.S., Ph.D., Arizona State University; Assistant Professor

Jagannathan Sankar, B.Eng., University of Madras; M.End., Concordia University; Ph.D., Lehigh University; Assistant Professor

Lonnie Sharpe, Jr., B.S., N. C. A. & T. State University; M.S., N. C. State University; Ph.D., University of Illinois; Associate Professor (P.E.)

S. L. Wang, B.S., Quin Hwa University; M.S., Ph.D., Ohio State University; Assistant Professor

Mechanical Engineering Undergraduate Courses

100	Engineering Orientation and Analysis
103	Introduction to Graphics Science
105	Computation Methods in M.E.
210	Numerical Methods in Mechanical Engineering
226	Manufacturing Processes
236	Manufacturing Processes Laboratory
335	Mechanics I, Statics
336	Strength of Materials
337	Mechanics II, Dynamics
346	Material Testing Laboratory
360	Materials Science
416	Fluid Mechanics
426	Fluid Mechanics Laboratory
440	Mechanism Design and Analysis
474	Engineering Design
441	Thermodynamics I
442	Thermodynamics II
444	Undergraduate Projects
540	Dynamics of Mechanical Engineering Systems
544	Special Topics
560	Modern Engineering Materials
562	Heat Transfer
563	Energy Conversion System Design
564	Machine Design I
565	Machine Design II
567	Environmental Control
568	Gas Dynamics
569	Engineering Materials Lab
570	Internal Combustion Engines
571	Turbomachinery
572	Mechanical Engineering Seminar I
573	Mechanical Engineering Seminar II
574	Mechanical Systems Design
575	Solar Energy Fundamentals and Design
579	Thermal Science Laboratory

Advanced Undergraduate/Graduate Courses

612	Modern Composite Materials
614	Mechanics of Engineering Modeling
619	Computer-Aided Graphics and Design
646	Advanced Manufacturing Processes
647	Advanced Mechanism Design
650	Mechanical Properties and Structure of Solids

THE SCHOOL OF NURSING

Beverly L. Malone, Dean

The School of Nursing offers a program leading to the Bachelor of Science Degree in Nursing. The school is organized into lower and upper divisions. The first two academic years or lower division of the program encompass the core requirements of the University and the foundation courses for the major. The upper division or last two academic years is largely devoted to Nursing Courses.

PHILOSOPHY AND OBJECTIVES

The School of Nursing is an integral part of North Carolina Agricultural and Technical State University and adheres to the purpose and objectives of the University. The School subscribes to the principles and theories that describe and predict man's behavior.

The faculty believes that man is a biopsychosocial, spiritual being who is continuously developing and adapting. He has the potential for growth and maturity through his capacity to interact with others and the environment. Man is an active participant in society with the ability to maintain himself while undergoing continuous change. The nursing program is based on the faculty's beliefs concerning man and his intrinsic worth. Our participation through nursing education is in the preparation of the student to assist the individual in making his maximum contribution to society.

The faculty believes that society is a dynamic structure which is culturally diverse and consists of individuals, families and communities, with the family as the basic unit.

We believe health is an ever-changing phenomenon which is defined by society's cultural values, assumptions and attitudes. Health is viewed on a health-illness continuum, and individual life styles greatly influence one's position on this continuum. Every individual has the right to utilize internal and

external resources to maintain an optimum level of health. Nursing has a primary responsibility to facilitate the attainment and maintenance of this goal.

Education is a continuous process providing the learner with opportunities for personal growth and the acquisition of insight into the nature of self and man. Education prepares the learner for humanistic and professional endeavors in a dynamic society.

We believe that nursing education is a systematic process whereby the learner engages in critical thinking and applies scientific theories, principles, and concepts to nursing. Nursing education addresses man, society, and the culture of the individual in moving him toward a state of health.

We believe that the person prepared to render professional nursing care utilizes knowledge, understanding, and skills derived from the biological, psychological, sociocultural and humanities areas of study in assessing and making judgments. We further believe that the person prepared to render professional nursing care has the responsibility for teaching the individual, the family and community, and for health promotion, illness prevention, and health restoration.

The faculty believes that nursing is an essential profession, sensitive, accountable and responsive to the changing health needs of society. Thus, professional functions will be altered, extended, and developed within the various nursing roles. The methodology of nursing is the nursing process, and entails independent, interdependent, and dependent actions which contribute to the health and well-being of individuals, families and communities.

We further believe that the person prepared in this program to render professional nursing care has the foundation to pursue graduate education.

The objectives of the Nursing Program at North Carolina Agricultural and Technical State University are designed to provide learning experiences that will assist nursing students to:

1. Integrate knowledge from liberal arts and the sciences as a foundation for nursing practice.

2. Fulfill the functions and responsibilities of the professional nurse.
3. Continue professional and personal development.

At the completion of this program the graduate will be able to:

1. Recognize the basic needs of man and the relationship of these needs to his behavior in the prevention of illness, promotion of wellness and in the movement toward self-actualization.
2. Utilize concepts, principles and theories from natural and behavioral sciences, and nursing to analyze and solve health care problems of individuals, families and communities.
3. Demonstrate the ability to think critically and make decisions utilizing the nursing process as the methodology for the practice of nursing.
4. Recognize contributions of nursing research and apply findings to nursing practice.
5. Accept responsibility and accountability for professional nursing actions.
6. Practice the roles of learner, practitioner, teacher, collaborator, leader and patient advocate in the delivery of professional nursing service.
7. Apply principles of teaching and learning in the promotion of health care.
8. Act as a change agent within the health care system to promote health in a culturally diverse society.
9. Recognize the need for continuous study and assume responsibility for personal and professional development.

ACCREDITATION AND MEMBERSHIPS

The program offered by the School of Nursing is accredited by The North Carolina Board of Nursing and the National League for Nursing. The School of Nursing is an agency member of the National League for Nursing in the NLN Council of Baccalaureate and Higher Degree Programs, the American Association of Colleges of Nursing and the Southern Regional Education Board Council on College Education for Nursing.

GENERAL PROGRAM REQUIREMENTS

The area of general program requirements include general information, admission, progression and graduation requirements.

General Information

Nursing Majors are required to purchase uniforms for the Spring Semester of the Sophomore Year. The Estimated Cost is (\$115.00) one hundred and fifteen dollars. Beginning in the Sophomore Year, students are required to secure liability insurance through the School of Nursing.

Learning experiences are provided in a variety of health care agencies. Students will provide their own transportation.

Students are required to attend all nursing classes with absences permitted only in unusual circumstances. Make up time lost during clinical nursing practice experiences will be left to the discretion of the faculty.

A minimum of 126 credit hours is required for graduation with a Bachelor of Science in Nursing. A minimum of 36 credit hours must be earned at North Carolina Agricultural and Technical State University.

Graduates of the Nursing Program are eligible for admission to the North Carolina State Licensure Examination.

Admission Criteria for Freshmen—Students

- A. The Applicant must be a graduate of an accredited high school having completed sixteen units of credit, and
 1. have a combined Scholastic Aptitude Test Score of 750 or above, or
 2. achieve a cumulative average of "B".
- B. Admission into the nursing major will depend upon the completion of the following courses or equivalent courses with a grade of "C" or a 2.0 in each course:

Chemistry 104, 105, 114, 115 8 hrs.
 Mathematics 101, 102 6 hrs.
 General Zoology 160 4 hrs.
 Ideas and Their Expressions 100, 101 6 hrs.

- C. Students seeking transfer into the nursing major must provide evidence of having completed the above courses maintaining a 2.0 or better, and a cumulative average of at least 2.0.

Progression Requirements

- A. Courses in the nursing major must be completed in the sequence of the designed curriculum.
- B. All science courses required in the nursing major must be completed with achievement of at least a 2.0 grade point for each.
- C. Each nursing course must be completed with a grade point of at least 2.6.
- D. A second failure in the nursing major will prevent continuing in the nursing program for any enrolled nursing student.

Graduation Requirements

- A. The completion of all nursing courses with a cumulative grade point average of not less than 2.6.

CAREER OPPORTUNITIES

The Bachelor of Science Degree in Nursing when accompanied by nursing licensure prepares the graduate for first level employment positions in a variety of nursing settings. Some possible opportunities include, institutional (hospitals), public health agencies, clinics, military services and private practice.

POLICY REGARDING PHYSICAL OR EMOTIONAL HEALTH

The School of Nursing reserves the right to dismiss a student from the Nursing Program who (1) presents problems in physical or emotional health which do not respond to appropriate treatment and/or counseling within a reasonable

period of time and (2) demonstrates behavior which conflicts with safety essential to nursing practice. Affected students will be accorded due process procedures made available by the University.

SUGGESTED CURRICULUM GUIDE FOR A NURSING MAJOR

Freshman Year

<i>First Semester</i>	Credit
101 Mathematics	3
100 Ideas and Expressions	3
104 Chemistry	3
114 Chemistry Lab	1
160 Zoology	4
100 Nursing Orientation (Generic Only)	1
101 Physical Education or	1
200 Personal Hygiene	2
	16 or 17

<i>Second Semester</i>	Credit
102 Mathematics	3
101 Ideas and Expressions	3
105 Chemistry	3
115 Chemistry Lab	1
121 General Microbiology	4
102 Physical Education	1
	15

Sophomore Year

<i>First Semester</i>	Credit
100 Western Civilization	3
200 Humanities	3
320 General Psychology	3
461 Human Anatomy & Physiology	4
200 Perspectives of the Nursing Profession	1
201 Nursing Competency Lab	1
290 Orientation to Baccalaureate Nursing (R.N. Only)	2
	15 or 17

<i>Second Semester</i>	Credit
101 Western Civilization	3
201 Humanities	3
100 Principles of Sociology	3
337 Nutrition & Dietetics	3
210 Nursing Process (Introduction)	3
211 Nursing Competency Lab	2
290 Orientation to Professional Nursing (R.N. Only)	2
	17

Junior Year

<i>First Semester</i>	Credit
300 Health Needs of the Nuclear Family	5
301 Nursing Competency Lab	1
302 Nursing Practice	4
Electives (Behavioral Science)	3
250 Speech Fundamentals	2
	15

<i>Second Semester</i>	Credit
310 Pathophysical Needs of Man	5
311 Nursing Competency Lab	1
312 Nursing Practice	4
434 Abnormal Psychology	3
Electives (Behavioral Sciences)	3
	16

Senior Year

<i>First Semester</i>	Credit
400 The Pathophysical Needs of Man, 400.02	6
401 Nursing Practice 401.15	6
Electives	3
	15

<i>Second Semester</i>	Credit
410 The Psychosocial Needs of Families, Generic/R.N.	6
411 Nursing Practice Generic/R.N.	6
Nursing Seminar, 563.01 Generic/563.02 R.N.	2
Electives	3
	17

DIRECTORY OF FACULTY AND COURSES

Beverly L. Malone, Ph.D., R.N., B.S.N., University of Cincinnati; M.S., Rutgers The State University; Ph.D., University of Cincinnati; Associate Professor and Dean

Virginia Armentrout, Diploma, R.N., Kings County Hospital Center; B.S., Syracuse University; M.S., University of North Carolina School of Public Health at Chapel Hill; Ed.D., University of North Carolina at Greensboro; Associate Professor

Dorothy Burns, A.D., R.N., Brooklyn College; B.S., North Carolina A. and T. State University; M.S., University of North Carolina at Greensboro; Assistant Professor

Elizabeth Cooper, Ed.D., R.N., B.S.N., North Carolina Central University; M.P.H., UNC-Chapel Hill; M.S.Ed., North Carolina A. & T. State University; Ed.D., Texas Southern University; Assistant Professor

Jo Ann Covington, Diploma, R.N., Kate Bitting Reynolds School of Nursing; B.S., Psychology, North Carolina A. & T. State University; B.S., Nursing, North Carolina A. & T. State University; M.P.H., University of North Carolina School of Public Health at Chapel Hill; Instructor

Mary Ella Graham, Ed.D., R.N., B.S., Long Island University; M.Ed., Teachers College Columbia University; Ed.D., Teachers College Columbia University; Assistant Professor and Assistant Dean

*Charlotte Perry, Diploma, R.N., Grasslands School of Nursing; B.S., San Jose College; M.P.H., University of North Carolina School of Public Health at Chapel Hill; Assistant Professor

Sandra Hicks, B.S., R.N., North Carolina A. and T. State University; M.S., Medical College of Georgia; Assistant Professor

Junia A. Jenkins, Diploma, R.N., Hampton Training School of Nursing; B.S., North Carolina College; M.S., Boston University; Assistant Professor

Marie Martin, B.S., R.N., North Carolina A. and T. State University; B.S., North Carolina Central University; M.P.H., University of North Carolina School of Public Health at Chapel Hill; Assistant Professor

Helen B. McCullough, Diploma, R.N., St. Agnes School of Nursing; B.S., St. Augustine's College; M.S., North Carolina A. and T. State University; M.S.Ed., North Carolina A. and T. State University; Associate Professor

Patricia J. Price, B.S., R.N., Winston-Salem State University; M.S., University of North Carolina at Chapel Hill; M.S.Ed., North Carolina A. and T. State University; Associate Professor

Margaret C. Warren, B.S., R.N., North Carolina A. and T. State University; M.S., University of Maryland; Associate Professor

Susan Wilson, Ed.D., R.N., Ed.D., Temple University; M.N., University of Florida; B.S.N., University of Alabama; Assistant Professor

Sharon Rankin, B.S., R.N., North Carolina A. and T. State University; M.S., University of North Carolina at Greensboro; Assistant Professor

Patricia Shelton, B.S., R.N., North Carolina A. and T. State University; M.S., University of North Carolina at Greensboro; Assistant Professor

<i>Courses</i>
100 Nursing Orientation
200 Perspectives of the Nursing Profession I
201 Nursing Competency Lab I
210 Perspectives of the Nursing Profession II
211 Nursing Competency Lab II
290 Transition to Baccalaureate Nursing
300 Health Needs of the Nuclear Family
301 Nursing Competency Lab III
302 Nursing Practice I
310 Pathophysical Needs of Man I
311 Nursing Competency Lab IV
312 Nursing Practice II
380 Man's Health and the Environment
393 Management In Health Care Settings
400 Pathophysical Needs of Man II
400.02 Pathophysical Needs of Man II
401 Nursing Practice III
401.15 Nursing Practice III
408 Nursing Intervention In Crisis
410 Psychosocial Needs of Families
411 Nursing Practice IV
500 Human Sexuality
501 Dimensions of Death Education
504 Independent Study
563 Nursing Seminar

The Freshman Advisement and Learning Assistance Center

Sandra Alexander, Director

OBJECTIVES

The objectives of the Freshman Advisement and Learning Assistance Center are to provide opportunity for underprepared students to: (1) achieve competence in communication skills during the freshman year in reading, writing, speaking and listening through a comprehensive, personalized instruction program. These students may advance at their own rate of speed through a carefully tailored series of educational experiences under the tutelage of their mentors; (2) achieve competence in computational skills during the freshman year in basic college mathematics by subjecting themselves to a series of remedial, computational, and problem-solving experiences that are structured and monitored by faculty to insure skill development. Students will be permitted to work cooperatively and independently and proceed at their own rate until mastery of computational skills has been achieved and realized by the student. Students in the freshman class will be taught collectively and/or individually how to study and succeed in a college program. Basic concepts of studying will be taught, such as budgeting one's time, how to study for examinations, how to organize and take notes, and the psychology of taking tests and passing them in various disciplines.

The center is also responsible for coordinating the advisement program for freshman students and undecided majors.

DIRECTORY OF FACULTY AND COURSES

Faculty

Sandra Alexander, B.S., North Carolina A. and T. State University; M.A., Harvard University; Ph.D., University of Pittsburgh

Mattie J. Dalton, B.S., Shaw University

Anne Floyd, B.S., University of North Carolina at Greensboro; M.S., North Carolina A & T State University

Gwendolyn Godard, B.S., North Carolina A & T State University

Barbara Hill, B.A., North Carolina Central University; M.Ed., University of North Carolina at Greensboro

Brenda Hodge, B.A., North Carolina Central University; M.Ed., University of North Carolina at Greensboro

Julia Kendall, B.S., M.S., North Carolina A & T State University

Laura McMillan, B.S., North Carolina A & T State University

Linda Rodgers, B.S., M.S., North Carolina A & T State University

Myrtle Soloman, B.S., M.A., North Carolina A & T State University

Courses

Basic Reading and Writing Skills

Intermediate Mathematics

Pre-calculus for Engineers and Scientists



Department of Military Science

Lt. Col. Benjamin F. Foster, Jr.
Professor

OBJECTIVE

The objective of the Army Reserve Officers' Training Corps (ROTC) is to train, motivate and prepare selected students with potential to serve as commissioned officers in the Regular Army, Army Reserve or the Army National Guard. The program is designed to provide an understanding of the fundamental concepts and principles of military art and science and to develop leadership and managerial potential in the student. A strong sense of personal integrity, honor, and individual responsibility and an appreciation of the requirements for national security is instilled in all students. Attainment of these objectives will prepare students for commissioning and will establish a sound basis for their future professional development and effective performance in the Army or civilian life.

DEGREES OFFERED

Leads towards a commission in the United States Army.

GENERAL PROGRAM REQUIREMENTS

The ROTC program is divided into a basic course, which is normally taken during the freshman and sophomore years, and an advanced course, which is taken during the next two years. The admission of students to the ROTC program is based upon general admission requirements of the University as pertaining to a full-time student.

DEPARTMENT REQUIREMENTS

Programs of instruction for the Army ROTC include a four-year program and a two-year program. The four-year program consists of the two-year basic course, the two-year advanced course, and the Advanced ROTC Summer Camp. The two-year program encompasses a Basic ROTC Summer Camp, the two-year advanced course and the Advanced Summer Camp.

Basic Course: The basic course is designed to introduce the student to basic military concepts and the organization and mission of the U.S. Army. Those students who successfully complete this course are eligible to enter into the advanced course.

Credit for the basic course can be obtained by successfully completing Military Science 101, 102, 201, 202 and a leadership laboratory must be taken concurrently each semester with the class. Prior service in the Armed Forces can be used to obtain appropriate credit for the basic course.

Advanced Course: The advanced course is designed to produce officers for the active Army as well as the Reserve Components. Entry into the advanced course is on a best qualified basis. The student must possess qualifications for becoming an effective Army officer. Applicants must attain a certain minimum score to determine academic potential. The applicants must have a minimum of two years of academic work remaining at the educational institution in a curriculum leading to either a baccalaureate or advanced degree in a recognized academic field of study. In addition, each student must successfully complete an Advanced Summer Camp of at least six weeks. Applicants must also pass an Army medical examination. The following courses are required for completion of the advanced course: Military Science 301, 302, 401, 402 and a leadership

laboratory must be taken each semester.

Two Year Program: This program is designed for junior college students or sophomores at four-year institutions who have not taken ROTC. A basic six-week summer training period after the sophomore year takes the place of the basic course required of students in the traditional four-year program. When a student with two years of college has successfully completed the basic summer training, he is eligible for the advanced ROTC course in his junior and senior years. The advanced course, which leads to an officer commission, is the same for students in either the four-year program or the two-year program.

CAREER OPPORTUNITIES

Successful completion of the ROTC program qualifies a student for a commission as a Second Lieutenant in one of the following branches of the Army: Adjutant General's Corps, Armor, Infantry, Military Police Corps, Ordnance Corps, Quartermaster Corps, Signal Corps, Medical Service Corps, Corps of Engineers, Finance Corps, Aviation, Field Artillery, Air Defense Artillery, Transportation Corps and Army Nurse Corps. Special requirements and/or additional training is required for commissioning in the Medical Corps, Army Medical Specialist corps, Veterinarian Corps, and the Judge Advocate General's Corps.

FINANCIAL AID

A subsistence fee of \$100.00 per month is paid advanced course and scholarship cadets during the entire normal academic year while a member of the Army ROTC. Four, three and two year scholarships are available. Details on scholarships are published by the Department of the Army and by the Military Science Department. In addition to subsistence fee, the Army pays tuition, laboratory fees, book cost and certain supplies.

DIRECTORY OF FACULTY AND COURSES

Benjamin F. Foster, Jr., LTC, IN,
BS, Hampton Institute; MA,
Webster University
Darryl D. Magee, MAJ, IN, BS,
United States Military Academy
Mariano Corpuz, MAJ, SC, BS,
Seattle University; MBA, Fair-
leigh Dickinson University
Hazel L. Young, CPT, AG, BS,
Southern University and A&M
College, MS, North Carolina A&T
State University
Romeo H. Morrissey, CPT, MP, BS,
North Carolina A&T State Uni-
versity; MA Webster University
Charlie R. Jackson, CPT, TC, BS,
Florida A&M University

David W. Goetze, CPT, MP, BA,
North Carolina State University
Michael Guyton, CPT, AR, BS, West
Virginia State College
Mark Bowers, CPT, AD, BA, Fur-
man University, MPA, Brenau
College

Courses in Military Science (MS)

- 101 Introduction to the
Citizen/Soldier
- 102 Introduction to United States
Military Forces in Support of
National Defense
- 105/107 Leadership Laboratory*
- 201 Branches of the Army and
Leadership Principles
- 202 Map Reading Skill
Development

- 205/207 Leadership Laboratory*
- 301 Introduction to Military Team
Theory
- 302 Leadership Training
- 305/307 Leadership Laboratory*
- 401 Seminars in Leadership and
Professional Development
- 402 Advanced Military Team The-
ory and Active Duty
Orientation
- 405/407 Leadership Laboratory*
- 105 Leadership Laboratory*
- 206 Army ROTC Basic Camp*
(Internship Program)
- 306 Army ROTC Advanced Camp*
(Internship Program)
- 406 Airborne Training** (Intern-
ship Program)

**Denotes Pass/Fail rather than a letter grade
and must be taken every semester.
+Optional training on a selected basis.*



Department of Aerospace Studies

Lt. Col. Walter L. Watson, Jr.,
Professor

OBJECTIVE

The United States Air Force maintains a permanent Air Force Reserve Officer Training Corps at this institution for the purpose of conducting leadership training, military training, and flight training. The specific objective is to conduct a modern academic program keyed to the development of the Professional Officer. This program is offered in two divisions. The lower division for Freshmen and Sophomores is termed the General Military Course. The upper division, established as the Professional Officer Course, is designed to continue the training of Juniors and Seniors so as to provide a complete four-year officer preparatory program. The entire Aerospace Studies curriculum is designed to commission quality young men and women who are not only educated in the academics of their university, but who have a competency in certain military skills, and a strong motivation for active duty and an Air Force Career.

PROGRAM OF INSTRUCTION

General Military Course (GMC). This course is open to freshmen and sophomores and is designed to provide the student with a basic foundation in the history and development of air power and the organization and mission of the U.S. Air Force. Those students who successfully complete this course are eligible to attend Field Training and to enroll in the Professional Officer Course (discussed below). *Field Training.* AFROTC Field Training is offered during the summer months at selected Air Force bases throughout the United States. Students in the four-year program participate in four weeks of Field Training during the summer, usually between their

sophomore and junior year. The major areas of study in the four-week Field Training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions and Air Force environment, and physical training.

Students applying for entry into the two-year program must successfully complete six weeks of Field Training prior to enrollment in AFROTC. Application for the two year program must be made during the Fall (or early Spring) Semester of the sophomore year. The major areas of study included in the six-week Field Training program are essentially the same as those conducted at four-week Field Training and in the General Military Course, including Leadership Laboratory.

Professional Officer Course (POC). Entry into the Professional Officer Course is competitive in nature. Applicants must attain a certain minimum score on the Weighted POC Selection System (WPSS). WPSS is a selection system that uses a number of weighted factors. Included in the factors are cumulative grade point average, scholastic aptitude test scores, Air Force Officer Qualifying Test scores, and Unit Commander's Rating (UCR). Applicants must also pass an Air Force medical examination. The first year of the POC is a study of management and leadership. The final year deals with the formulation and implementation of American Defense Policy and the Military Law System.

Leadership Laboratory. Leadership Laboratory is taken an average of one hour per week throughout the student's four years of enrollment in AFROTC. Two-year program students participate while in the Professional Officer Course. Instruction is conducted within the framework of an organized cadet corps with a progression of experiences designed to develop each student's leadership potential and management skills. Leadership Laboratory involves a study of Air Force customs and courtesies; drill and ceremonies; career opportunities in the Air Force; and the life and work of an Air Force Junior Officer. Students develop their leadership potential and management skills, in a practi-

cal supervised laboratory, which typically includes field trips to Air Force installations throughout the U.S.

UNIFORMS AND EQUIPMENT

All regularly enrolled cadets of the Air Force ROTC are furnished cost-free, Air Force ROTC uniforms, equipment, and textbooks. A deposit of fifteen dollars (\$15.00) is required of all cadets when issued the uniform as security for clothing and equipment. The fee will be refunded upon return of all items issued. Each cadet is responsible for the maintenance and security of property. All property issued, must be returned at the end of the normal school year or upon withdrawal from school.

TRANSFER CREDIT

Transfer credit is permitted for cadets entering the Air Force ROTC from another advanced ROTC program (Air Force, Army or Navy) at any college, university or academy.

FINANCIAL AID

A subsistence fee of \$100.00 per month is paid advanced cadets (juniors and seniors) during the entire normal academic year while a member of the Air Force ROTC.

Scholarships may be granted for periods of two, two and one half, three, three and one half, and four years. Details on scholarships will be published by the Department of the Air Force and by the Department of Aerospace Studies, N.C. A&T State University. All students on scholarship receive \$100.00 per month tax-free allowance and the Air Force can pay tuition, laboratory fees and a book allowance.

STRUCTURE OF THE CADET GROUP

The Air Force ROTC Cadet Group, commanded by a Cadet Lieutenant Colonel, consists of two squadrons. Within the structure of this Group are such special functions as: The Cadet Drill Team, Arnold Air Society and Angel Flight.

SPECIAL HONORS

Outstanding performance in the Air Force ROTC Training Program, on the part of certain selected cadets can bestow on them the honor of Distinguished Graduate. Other honors are the Commandant's Award and the Vice-Commandant's Award.

CADET WELFARE FUND

All AFROTC Cadets are members of the Cadet Welfare Fund. A membership fee of \$5.00 is requested at initial session each semester. These fees are used to defray expenses for various cadet social activities.

AIR FORCE ROTC OFFICER CLUB

The Cadet Officers Club provides advanced cadets with an opportunity to demonstrate organizational leadership ability and to promote social and cultural activities. Each

advanced (POC) cadet is requested to become a member of the club and is obligated to pay club dues. The amount of the dues will be determined by club members each school year.

DIRECTORY OF FACULTY AND COURSES

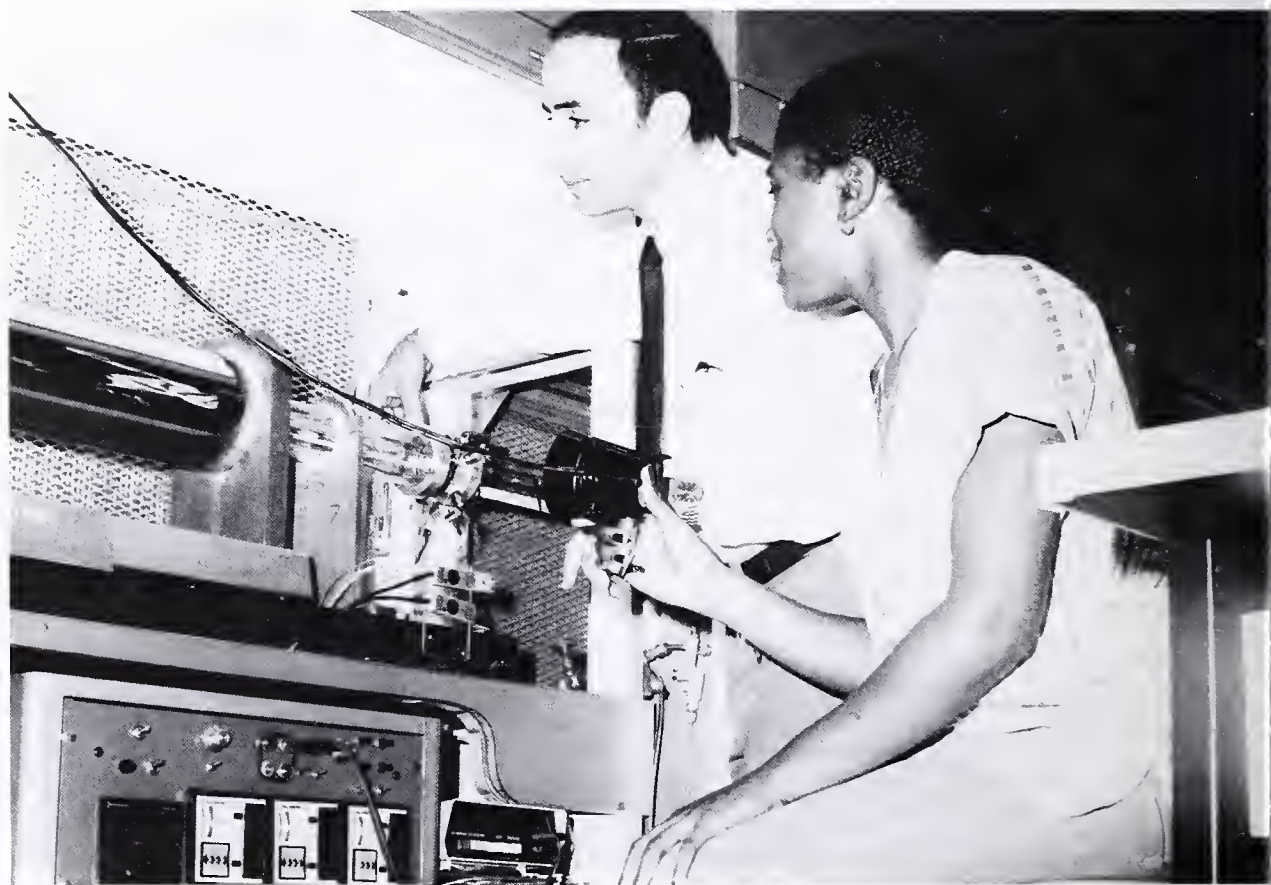
Faculty

Lt. Col. Walter L. Watson, Jr., B.S., Howard University; M.S., Chapman College; Professor
Captain Kimberly Y. Jones, B.A., Tennessee State University; M.S., Golden Gate University; Assistant Professor
Captain Anthony L. Hardin, B.S., Southern Illinois University; M.A., Central Michigan University; Assistant Professor
Captain Samuel L. Bates, B.S., NC State University; M.S., Central Michigan University; Assistant Professor
M.A., Central Michigan University; Assistant Professor

Courses

- 101 The US Air Force Today I
- 102 Leadership Laboratory
- 103 The US Air Force Today II
- 104 Leadership Laboratory
- 201 The Development of Air Power
- 202 Leadership Laboratory
- 203 The Development of Air Power II
- 204 Leadership Laboratory
- 401 The Professional Officer I
- 402 Leadership Laboratory
- 403 The Professional Officer II
- 404 Leadership Laboratory
- 501 National Security Forces in Contemporary American Society I
- 502 Leadership Laboratory
- 503 National Security Forces In Contemporary American Society II
- 504 Leadership Laboratory
- 505 Flight Training—Ground School

Course descriptions are available upon request from the Professor of Aerospace Studies



THE GRADUATE SCHOOL

Albert W. Spruill, Dean

Graduate education at North Carolina Agricultural and Technical State University was authorized by the North Carolina State Legislature in 1939. The authorization provided for graduate training in agriculture, applied science and allied areas of study. An extension of the graduate program, approved by the General Assembly of North Carolina in 1957, provided for enlargement of the program to include teacher education as well as such other programs of a professional or occupational nature as might be approved by the State Board of Higher Education.

OBJECTIVES OF THE GRADUATE SCHOOL

The Graduate School of North Carolina Agricultural and Technical State University offers advanced study for qualified individuals who wish to improve their competence for careers in professions related to agriculture, applied science, education, science research, technology, the humanities and the social sciences. Such study of information and techniques is provided through courses of study leading to the Master of Science degree and through institutes, workshops, and individual courses designed for those who are not candidates for a higher degree but who desire advanced work in certain fields of study. Second, the Graduate School provides the foundation of knowledge and of techniques required for those who wish to continue their education in doctoral programs at other institutions. Third, the Graduate School assumes the responsibility of stimulating and encouraging scholarly research among students and faculty members.

It is expected that, in the course of their studies, graduate students (1) will have acquired special competence in at least one field of knowledge; (2) will have developed

further their ability to think independently and constructively; and (3) will have developed and demonstrated the ability to collect, organize, evaluate, and report facts which will enable them to make a contribution in their field of study.

DEGREES GRANTED

The Graduate School of North Carolina A&T State University offers the following degrees:

MASTER OF ARTS

English and Afro-American Literature

MASTER OF SCIENCE

Adult Education
Agricultural Economics
A. Agricultural Marketing
B. Production Economics
C. Rural Development
Applied Mathematics
Architectural Engineering
Biology
Chemistry
Electrical Engineering
Engineering
Food and Nutrition
French
Industrial Engineering
Mechanical Engineering
Plant and Soil Science
Transportation
Specialized Teaching and Related Fields

- A. Administration, Supervision and Post-Secondary Education
 - (1) Administration
 - (2) Supervision
- B. Agricultural Education
- C. Educational Media
- D. Elementary Education and Reading
 - (1) Early Childhood Education
 - (2) Elementary Education
 - (3) Intermediate Education
 - (4) Reading
- E. Guidance or Counseling Education
 - (1) Agency Counseling
 - (2) Counselor—Education
 - (3) Human Resources
- F. Industrial Education
 - (1) Industrial Arts Education
 - (2) Vocational Industrial Education
 - (3) Safety and Driver Education

Specialized Secondary Education Teaching Fields with Majors in Subject Matter Departments

- A. Art
- B. Biology
- C. Chemistry
- D. English
- E. History
- F. Mathematics
- G. Health and Physical Education
- H. Social Science

Certificate in Advanced Graduate Studies

Educational Media

*See Graduate School Bulletin for complete instructions.

ADMISSION TO GRADUATE SCHOOL

All applicants for graduate study must have earned a bachelor's degree from a four-year college. Application forms may be obtained from the office of the Graduate School and must be returned to that office with two transcripts of previous undergraduate and graduate studies. Processing of applications cannot be guaranteed unless they are received, with all supporting documents, in the Graduate Office at least fifteen days before a registration period. Applicants may be admitted to graduate studies unconditionally, provisionally, or as special students.

Unconditional Admission. To qualify for unconditional admission to graduate studies, an applicant must have earned an over-all average of 2.6 on a 4 point system (or 1.6 on a 3 point system) in his undergraduate studies. In addition, a student seeking a degree in Agricultural Education Industrial Education, or Secondary Education must possess, or be qualified to possess, a Class A Teaching Certificate in the area in which he wishes to concentrate his graduate studies. A student seeking a degree with concentration in Administration, Supervision, Elementary Education, or Guidance must possess, or be qualified to possess a Class A Teaching Certificate.

Provisional Admission. An applicant may be admitted to graduate studies on a provisional basis if (1) he earned his

baccalaureate degree from a non-accredited institution or (2) the record of his undergraduate preparation reveals deficiencies that can be removed near the beginning of his graduate study. A student admitted provisionally may be required to pass examinations to demonstrate his knowledge in specified areas, to take special undergraduate courses to improve his background, or to demonstrate his competence for graduate work by earning no grades below "B" in his first nine hours of graduate work at this institution.

Special Students. Students not seeking a graduate degree at A&T State University may be admitted in order to take courses for self-improvement or for renewal of teaching certificates. If a student subsequently wishes to pursue a degree program, he must request an evaluation of his record. The Graduate School reserves the right to refuse to accept as credit for a degree program hours which the candidate earned while enrolled as a special student; in no circumstances may the student apply towards a degree program more than twelve semester hours earned as a special student.

Admission to Candidacy for a Degree. Admission to graduate studies does not guarantee admission to candidacy for a degree. In order to be qualified as a candidate for a degree, a student must have a minimum over-all average of 3.0 in at least nine semester hours of graduate work at the University, must have removed all deficiencies resulting from undergraduate preparation, and must have passed the Qualifying Essay. Some departments require additional qualifying examinations. For details, see the *Graduate School Bulletin*.

Credit Requirements. The minimum course requirements for a graduate degree are thirty semester hours for students in thesis programs and non-thesis programs. It is expected that a student can complete a program by studying full-time for an academic year and a summer or by studying full-time during four nine-week summer sessions. A graduate student normally carries twelve to fifteen

semester hours each semester of an academic year. If he is teaching full-time, he may not pursue more than six semester hours during the academic year. During the summer he may not earn more than one hour of credit for each week of residence. A student who does not complete his degree within six successive calendar years may lose credit for hours earned more than six years prior to his application for graduation.

Other Requirements. All students must pass a final comprehensive examination.

Fees. Fees for graduate students are listed in General Information section of this catalogue.

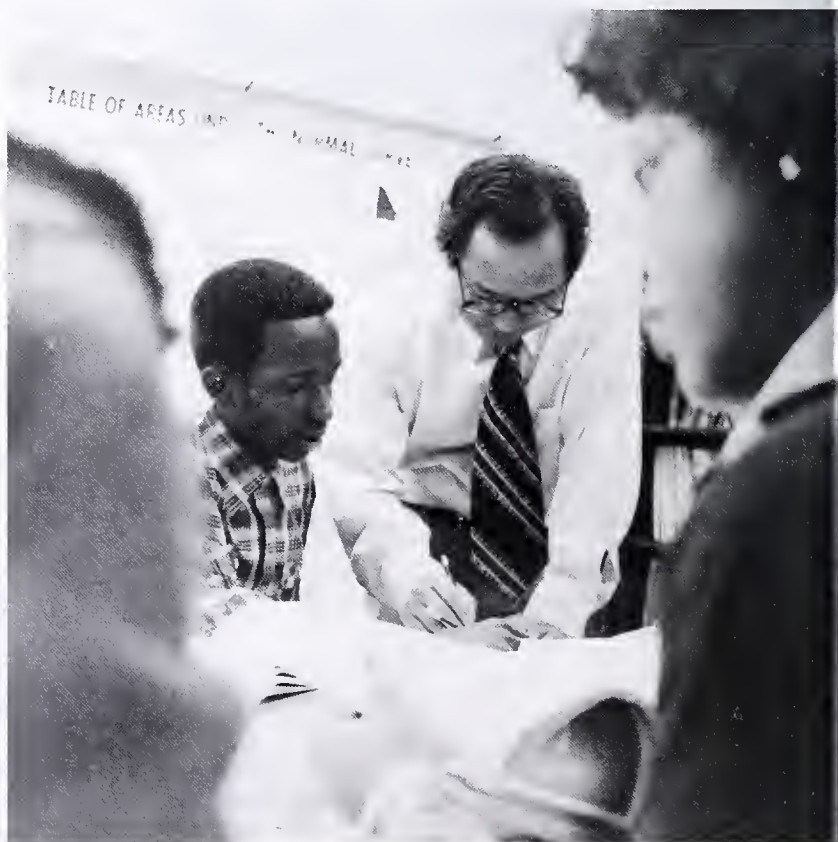
Financial Assistantships. A limited number of assistantships are available. These positions may

require teaching, laboratory supervision, research, or general assistance to a department or to a faculty member.

THE GRADUATE SCHOOL BULLETIN

General requirements for the Master's degree, curricula, course descriptions, and other information about graduate study will be found in the *Graduate School Bulletin*, which may be obtained from the Graduate Office.

For information write to: The Dean of the Graduate School, North Carolina Agricultural and Technical State University, Greensboro, N.C. 27411.



COURSE DESCRIPTIONS

Course descriptions are listed by schools and departments. They reveal the number and name of the course, and a brief description, as well as the number of semester hours of credit earned and the number of actual lecture and laboratory hours met each week. For example—Credit 3(3-1), the 3 indicates that three semester hours of credit are given for satisfactory completion of the course. The (3-1) indicates that the course meets for three hours of lecture and for one hour of laboratory work each week.

Course Number and Classification. Each course bears a distinguishing number which identifies it within the department (department codes are listed below) and indicates, broadly, its level. For example—150-330. Introduction to Agricultural Economics. The 150 indicates the department code and the 330 indicates the course number or level. Course numbers 100-399 are lower level courses and are primarily for freshmen and sophomores. Course numbers 400-599 are upper level courses and are primarily for juniors and seniors. Course numbers 600-699 are courses for undergraduate and graduate students. Course numbers 700-799 are courses for graduate students and appropriate professional students in special programs.

Department Codes

LANDSCAPE ARCHITECTURE COURSES	0100
DEPARTMENT OF AGRICULTURAL EDUCATION	0110
DEPARTMENT OF ANIMAL SCIENCE	0120
DEPARTMENT OF PLANT SCIENCE AND TECHNOLOGY	0130
DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY	0150
DEPARTMENT OF HOME ECONOMICS	0170
DEPARTMENT OF ART	0211
DEPARTMENT OF ENGLISH	0212
DEPARTMENT OF SPEECH COMMUNICATIONS AND THEATER ARTS	0215
DEPARTMENT OF FOREIGN LANGUAGES	0217
DEPARTMENT OF MUSIC	0219
DEPARTMENT OF PSYCHOLOGY	0220
DEPARTMENT OF BIOLOGY	0221
DEPARTMENT OF CHEMISTRY	0223
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE	0225
DEPARTMENT OF PHYSICS	0227
DEPARTMENT OF HISTORY	0233
DEPARTMENT OF SOCIOLOGY AND SOCIAL WORK	0235
DEPARTMENT OF POLITICAL SCIENCE	0237
DEPARTMENT OF CURRICULUM AND INSTRUCTION	0311
DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY	0312
DEPARTMENT OF HUMAN DEVELOPMENT AND SERVICES	0320
DEPARTMENT OF HEALTH, PHYSICAL EDUCATION AND RECREATION	0330
DEPARTMENT OF MANUFACTURING AND AUTOMOTIVE TECHNOLOGY	0860
DEPARTMENT OF TECHNOLOGY EDUCATION	0861
DEPARTMENT OF CONSTRUCTION MANAGEMENT AND SAFETY	0862
DEPARTMENT OF ELECTRONICS AND COMPUTER TECHNOLOGY	0863
DEPARTMENT OF SPECIAL AND ADVANCED ENGINEERING	0400
DEPARTMENT OF ARCHITECTURAL ENGINEERING	0410
DEPARTMENT OF ELECTRICAL ENGINEERING	0420
DEPARTMENT OF INDUSTRIAL ENGINEERING	0430
DEPARTMENT OF MECHANICAL ENGINEERING	0440
DEPARTMENT OF CHEMICAL ENGINEERING	0470
DEPARTMENT OF CIVIL ENGINEERING	0450
DEPARTMENT OF ACCOUNTING	0510
DEPARTMENT OF BUSINESS ADMINISTRATION	0520
DEPARTMENT OF BUSINESS EDUCATION AND ADMINISTRATIVE SERVICES	0530
DEPARTMENT OF ECONOMICS (Includes Transportation)	0531
DEPARTMENT OF NURSING	0600
GRADUATE STUDIES	0700
DEPARTMENT OF UNDECIDED (Undergraduate)	0200
DEPARTMENT OF UNDECIDED (Graduate)	0888
DEPARTMENT OF AEROSPACE STUDIES	0910
DEPARTMENT OF MILITARY SCIENCE	0920



SCHOOL OF ECONOMICS
B.C. Webb, Dean

**Department of Agricultural Economics and
Rural Sociology**
Richard Robbins, Chairperson

Undergraduate

150-130. Survey of the Food and Agribusiness Industries Credit 1(1-0)

An introductory overview of the characteristics, scope and functions of the U.S. food and fiber production/processing/distributing system: showing the relationships of input supply, farm production, and product processing—distribution-marketing complex, and their role in meeting food and fiber needs of people: identification of possibilities and requirements for training and service.

150-240. Introduction to Computers in Agribusiness Credit 3(3-0)

A course designed to familiarize students with the growing role of computers as a management aid in agribusiness. Topics covered include: electronic spread sheets, word processing, data base management, telecomputer communication flow charting, etc. Emphasis will be placed on the application of software to agribusiness and agricultural economics analysis.

150-330. Introduction to Agricultural Economics Credit 3(3-0)

An application of the fundamental principles of economics to agricultural production, marketing, land tenure, leasing arrangements, financing and related economic problems.

150-332. Elements of Farm Management Credit 3(3-0)
Principles which govern the effective organization and operation of the farm firm.

150-334. Marketing Agricultural Products Credit 3(3-0)

Principles and practices of marketing as applied to farm commodities. Form, place, time and possession utility, the ultimate consumer's market, the agricultural industries market, the middleman system, exchange market operation and futures contracts, price determination, reducing marketing costs. Visits will be made to local markets. Prerequisite: Ag. Econ. 330.

150-336. Agricultural Prices Credit 3(3-0)

Information regarding agricultural price changes, index numbers, price determination, seasonal and cyclical price movements, storage problems, and methods of controlling extreme price fluctuations, government price policy.

150-440. Resource Economics Credit 3(3-0)

Analysis of economic problems of resources use and management. Perception of and definition of problems in terms of allocation mechanism. Analysis of economic relationships over time and market externalities with emphasis on welfare implications. Prerequisite: Economics 300.

150-442. Cooperative Marketing Credit 3(3-0)

Early cooperative movements, principles of cooperatives, importance of cooperatives in the United States, problems of organization, management and operation of cooperative endeavors by farmers in buying and selling. Prerequisites: Ag. Econ. 330, 334.

150-444. Agribusiness Marketing Analysis Credit 3(3-0)

A course designed to develop an understanding of, and skill in, the marketing decision-making process. Emphasis will be placed on the competitive marketing environment and the analytical tools needed by the firm to make sound strategic marketing decisions. Case studies and marketing simulation games will be used where appropriate.

150-446. Financial Management of Agribusiness Firms. Credit 3(3-0)

Principles and techniques of management of short-term and long-term capital. Financial analysis, and special problems related to the acquisition and use of funds. Case studies and financial simulation games will be used where appropriate.

150-530. Economics of Food Distribution Credit 3(3-0)

Description of market structures and operations in the processing, and wholesale and retail distribution of food. The effect of industrial organization and government regulations on the efficiency of the market and consumer demand for food.

150-599. Independent Study I Credit 3(3-0)

This course is designed to provide academic credit to students of advanced undergraduate standing who are on cooperative internship or apprenticeship programs, when the nature of the assignment warrants such credits.

Advanced Undergraduate and Graduate

150-630. Rural Development Seminar Credit 3(3-0)

Discussion of current issues in rural and agricultural development in the U.S. and in developing countries. Review and discussion of current literature and reports or proposals on rural or agricultural development programs and policies. Prerequisite: Consent of Department Chairman.

150-632. Agri-Business Policy Credit 3(3-0)

The place of agri-business in the national and international economy; the impact of public policy on the industry. An analysis of policy as it relates to price support programs, finance, trade and resource development. Prerequisite: Ag. Econ. 330.

150-634. Commodity Marketing Problems Credit 3(3-0)

Economic problems arising out of the demand, supply and distribution of specific agricultural commodities; the price making mechanism, marketing methods, grades, values, price, cost, and governmental policy. Not more than two commodities will be studied in any one semester. Selection of commodities and emphasis on problem areas will be made on the basis of current need; commodities studied will be cotton, tobacco, fruits and vegetables, and grains. Prerequisite: Consent of the Department Chairman.

150-638. Special Problems in Agricultural Economics Credit 3(3-0)

Designed for students who desire to work out special problems in the field of agricultural economics; problem definition, formulation and investigation. Prerequisite: Consent of the Department Chairman.

150-640. Agri-Business Management Credit 3(3-0)

Methods of research, plans, organization, and the application of management principles. Part of the student's time will be spent in consultation with agri-business firms. Prerequisite: Consent of Department Chairman.

150-641. Special Problems in Agribusiness Management **Credit 3(3-0)**

This course relies heavily on the "Harvard Case Studies Approach" to make decisions and solve problems faced by agribusiness managers. Also, students will be exposed to quantitative techniques for analyzing and solving problems confronting the firm. Emphasis is placed on applying theoretical concepts to the real-world decision-making environment. Prerequisites: Ag. Econ. 640, or consent of instructor.

150-642. Seminar in Agricultural Economics **Credit 3(3-0)**

Discussion of reports and an appraisal of current literature on agricultural problems. Prerequisite: Consent of the Department Chairman.

150-644. Statistical Methods in Agricultural Economics I **Credit 3(3-0)**

Statistical methods with special applications to agricultural problems. The statistical table, ratios, percentages, bar charts, line charts, and frequency distribution are used as analytical tools. Prerequisites: Ag. Econ. 330, Econ. 301, or Sociology 302.

150-646. Statistical Methods in Agricultural Economics II **Credit 3(3-0)**

Statistical methods with special applications to agricultural problems. The time series analysis, sampling theory, analysis of variance, and simple correlation are used as analytical tools. This course is a continuation of Ag. Econ. 644.

150-648. Appraisal and Finance of AgriBusiness Firms **Credit 3(3-0)**

Principles of land evaluation, appraisal and taxation. The role of credit in a money economy, classification of credit, principles underlying the economic use of credit. The role of the government in the field of credit.

150-650. Human Resource Development **Credit 3(3-0)**

Analysis of human resources in relation to changing agricultural production technology in rural areas. Prerequisite: Consent of instructor.

150-675. Computer Applications in Agricultural Economics **Credit 3(3-0)**

This course is designed to provide students with the tools to utilize computers for agricultural decision-making. Emphasis will be placed on utilizing existing software packages for microcomputers and mainframe computers to make financial, economic and quantitative analyses of farm and agribusiness-related problems. Prerequisites: Ag. Econ. 330, or Econ. 300.

COURSES IN RURAL SOCIOLOGY

Undergraduate

150-300. Principles of Rural Sociology **Credit 3(3-0)**

Social systems, cultural patterns, and institutional arrangements of people in rural environments. An interpretation of the structure, functioning and change in rural social systems.

150-301. Rural Social Problems **Credit 3(3-0)**

A focus on the problems and solutions of population dynamics, education, religion, health, land tenure, parity income, farm labor, mechanization, housing, poverty, and rural development as they affect the growth of the rural community.

150-303. Rural Family **Credit 3(3-0)**

The institutional nature of the rural family, its role in the community, including its relations to educational, religious, welfare and other community organizations.

150-505. Rural Standards of Living **Credit 3(3-0)**

Consumption behavior in the main community groups of our rural society. The poverty threshold and the plight of the rural poor.

150-506. Special Problems in Rural Sociology **Credit (2 to 4 hrs.)**

Work on problems in the rural society under the guidance of a faculty member.

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION **A.P. Bell, Chairperson**

Undergraduate

110-101. Introduction and Orientation **Credit 1(1-0)**

A study of the broad base of modern agriculture with emphasis on current trends and opportunities.

110-102. Introduction and Orientation **Credit 1(1-0)**

A continuation of 101 with special emphasis on the development of agriculture as a modern technology and the impact of science on its development.

110-400. Audio-Visual Aids in Vocational and Technical Education **Credit 2(1-2)**

Techniques in preparing, using, and evaluating audio-visual aids in vocational and technical education.

110-401. Youth Organizations and Leadership **Credit 2-3(3-0)**

Practices and procedures of leadership development and the organization of youth groups in secondary schools, agricultural extension, and other community programs.

110-402. Secondary Education in Agriculture **Credit 2(2-0)**

Designed to acquaint students with the historical objectives of vocational education and agriculture, the problems in the area of secondary schools, and some solutions.

110-403. Teaching Out-of-School Groups **Credit 2(2-0)**

Methods and materials used in teaching adults and young farmers. It will include developing and using various teaching devices and aids for out-of-school groups.

110-404. Field Experiences in Vocational Agriculture **Credit 3(0-3)**

Participation in activities relating to programs, methods and skills basic to teaching vocational agriculture. Repeatable to a maximum of six credits.

110-405. Field Experiences in Cooperative Extension **Credit 3(3-0)**

Participation in experiences involving cooperative extension programs. Repeatable to a maximum of six credits.

110-406. Field Experiences in Other Agricultural Education Programs Credit 3(3-0)

Participation in experiences in agricultural education other than vocational agriculture and cooperative extension. Repeatable to a maximum of six credits.

110-501. Materials and Methods of Teaching Agricultural Education and Extension Credit 3(3-0)

Principles of teaching as applied to agriculture in secondary schools and cooperative extension. Preparing and using lesson plans and organizing teaching aids to meet community needs. Prerequisites: Agricultural Education 400, 401, and 402; Psychology 320.

110-502. Student Teaching Credit 6(6-0)

Students will be required to spend a minimum of twelve weeks in an approved teaching center doing observation and directed student teaching. Prerequisite: Agricultural Education 501.

110-503. Evaluation and Problems in Teaching Credit 3(3-0)

The process of discovering and analyzing problems in the field; program building, and evaluation of instruction. This will include an appraisal of all phases taught by the teacher of agriculture. Prerequisites: Agricultural Education 501 and 502.

Advanced Undergraduate and Graduate

110-600. Youth Organization and Program Management Credit 3(3-0)

Principles, theories, and practices involved in organizing, conducting, supervising and managing youth organizations and programs. Emphasis will be on the analysis of youth organization and programs in Vocational and Extension Education.

110-601. Adult Education in Vocational and Extension Education Credit 3(3-0)

A study of the principles and problems of organizing and conducting programs for adults. Emphasis is given to the principles of conducting organized instruction in agricultural education, extension and related industries.

110-603. Problem Teaching in Vocational and Extension Education Credit 3(3-0)

Practices in setting up problems for teaching unit courses in vocational and extension education.

110-604. Public Relations in Agriculture Credit 3(3-0)

Principles and practices of organizing, developing, and implementing public relations for promoting local programs in vocational agriculture and agricultural extension.

110-605. Guidance and Group Instruction in Vocational Education Credit 3(3-0)

Guidance and group instruction applied to agricultural occupations and other problems of students in vocational education.

110-606. Cooperative Work-Study Credit 3(3-0)

Principles, theories, organizations, and administration of cooperative work experience programs.

110-607. Environmental Education Credit 3(3-0)

Principles and practices of understanding the environment and the interrelated complexities of the environment. The course will include a study of agricultural occupations related to the environment and materials that need to be developed for use by high school teachers of agriculture and other professional workers.

110-608. Agricultural Extension Organization and Methods Credit 3(3-0)

Principles, objectives, organization, program development, and methods in cooperative extension.

110-609. Community Analysis and Rural Life Credit 3(3-0)

Educational processes, structure and function of rural society, and the role which diverse organizations, agencies, and institutions play in the education and adjustment of rural people to the demands of modern society.

110-664. Occupational Exploration of Middle Grades Credit 3(3-0)

Designed for persons who teach middle grades occupational exploration in the curriculum, sources and uses of occupational information, approaches to middle grades teaching, and philosophy and concepts of occupational education. This course will be taught in cooperation with the Department of Business Education and Administrative Services, Home Economics, and Industrial Education.

110-665. Occupational Exploration in the Middle Grades—Agricultural Occupations Credit 3(3-0)

Emphasis will be placed on curriculum, methods and techniques of teaching, and resources and facilities for teaching in the agricultural and environmental occupations cluster including Agribusiness and Natural Resources, Environmental Control, Hospitality and Recreation, and Marine Science.

DEPARTMENT OF ANIMAL SCIENCE

George A. Johnson, Chairperson

120-110. Science of Animals that Serve Mankind Credit 3(3-0)

A study of the fundamental principles of animal science for those students not majoring in the animal sciences. Emphasis will be on the role of animals that serve mankind. Offered in the Spring.

120-111. Introduction to Animal Science Credit 3(2-2)

A study of the application of basic sciences—animal genetics, physiology, nutrition and disease control—to improve dairy, livestock and poultry production, processing and merchandising. Offered in the Fall and Spring.

120-212. Applied Nutrition and Feeding Credit 3(3-0)
(Formerly 404)

Introduction to principles of nutrition on a comparative species basis, composition of feeds and principles of feeding. Prerequisite: Animal Science 111. Offered in the Spring.

120-214. Agricultural Genetics Credit 3(2-2)

A study of the basic principles of heredity in relation to animal and plant improvement. Laboratory work dealing with the cytological and genetical basis of inheritance. Prerequisite: Biology 100, Botany 130 or Zoology 160. Offered in the Fall.

120-217. Anatomy and Physiology of Farm Animals **Credit 3(2-2)**

Study of functions and structures of the body systems and organs of domestic animals. Prerequisite: Animal Science 111, Zoology 160. Offered in the Spring.

120-311. Livestock Production **Credit 3(2-2)**

Selection, breeding, feeding, housing and general management of beef cattle, sheep and swine. Prerequisite: Animal Science 212. Offered in the Spring.

120-312. Meat and Meat Products **Credit 3(2-2)**

Introduction of meats from the standpoint of the consumer, processor and producer. Emphasis on meat as a food; inspection, grading, processing, preservation and identification. Offered in the Fall.

120-313. Livestock Evaluation **Credit 1(0-3)**

Study of correlation of type, grade, degree of finish and other factors in the live animals with carcass grade, yield and value in cattle, sheep and swine. Objective and subjective selection of herd replacements. Prerequisite: Junior standing. Animal Science 111. Offered in the Fall.

120-413. Sanitation and Diseases of Farm Animals **Credit 2(2-0)**

Sanitation and the common diseases of livestock with reference to causes, prevention and treatment and their relation to the environment. Offered in the Spring only.

120-611. Principles of Animal Nutrition **Credit 4(3-3)**
(Formerly 601)

Fundamentals of modern animal nutrition including classification of nutrients, their general metabolism and role in productive functions. Offered in the Spring only.

120-613. Livestock and Meat Evaluation **Credit 2(1-2)**

Selection and evaluation of desirable animals in both market and breeding classes. Identification and evaluation of wholesale and retail cuts of meat. Prerequisite: Animal Science 312 and 313. Offered alternating Summers.

120-614. Animal Breeding **Credit 3(3-0)**

Application of genetic and breeding principles of livestock production and improvement. Phenotypic and genotypic effects of selection methods and systems of mating. Prerequisite: Animal Science 111 and 214. Offered in the Spring.

120-615. Selection of Meat and Meat Products **Credit 3(2-2)**

Identification, grading and cutting of meats. Offered in alternating summers.

120-617. Physiology of Reproduction of Farm Animals **Credit 3(2-2)**

Study of reproductive processes including anatomy, physiology and endocrinology. Semen production, artificial insemination and hormonal studies. Prerequisite: Animal Science 111 and Zoology 160. Offered in the Fall.

120-618. Seminar in Animal Science **Credit 1(1-0)**

A review and discussion of selected topics and recent advances in the fields of animal and food science. Prerequisite: Senior standing. Offered in the Spring.

120-619. Special Problems in Livestock Management **Credit 3(3-0)**

Special work in problems dealing with feeding, breeding and management in the production of beef cattle, sheep and swine. Prerequisite: Senior standing. Offered in the Fall.

120-713. Advanced Livestock Production **Credit 3(2-2)**

Review of research relating to various phases of livestock production; fitting the livestock enterprise into the whole farm system. Special attention to overall economic operation. Offered in the Fall.

COURSES IN DAIRY SCIENCE

120-321. Dairy Cattle Production **Credit 3(2-2)**

Management and selection for efficient milk production. Lactation, care of dairy equipment, use of records and housing of dairy cattle. Prerequisite: Animal Science 212. Offered in the Fall.

120-323. Dairy Cattle Evaluation **Credit 1(0-2)**

Characteristics of dairy breeds, comparative judging, selection of dairy cattle, sire selection and pedigrees. Prerequisite: Animal Science 111. Offered in the Spring.

120-340. Milk and Milk Products **Credit 3(2-2)**

Study of the chemistry of milk, milk processing, milk products and quality. Prerequisite: Chemistry 102 or 107. Offered in the Spring.

120-629. Special Problems in Dairy Management **Credit 3(3-0)**

Special work in problems dealing with dairy production. Prerequisite: Senior standing. Offered in the Spring only.

120-536. Food Plant Management **Credit 2(1-2)**

Organization and management of food plants. Procurement of raw material supplies, plant layout, equipment for plants distribution of products, costs of operation, and record keeping. Offered in the Fall.

120-541. Food Packaging **Credit 2(2-0)**

Characteristics of packaging materials, strength, elasticity permeability, food packaging machines, adhesives, as related to product wholesomeness and package design as a form of advertising. Prerequisite: Chemistry 102 or 107. Offered in the Fall.

COURSES IN POULTRY SCIENCE

120-351. Poultry Production **Credit 3(2-2)**

Practices and principles of poultry production. Prerequisite: Animal Science 111. Offered in the Fall.

120-354. Fundamentals of Poultry Breeding **Credit 4(3-2)**

Breeding and selection and improvement of stock. Prerequisite: Animal Science 214 and Poultry Science 351. Offered in alternating Springs.

120-553. Diseases and Parasites of Poultry **Credit 3(2-2)**

Poultry hygiene; causes of diseases; symptoms and control of diseases and parasites. Prerequisite: Poultry Science 351. Offered in the Fall.

120-555. Incubation and Hatchery Management Credit 4(2-4)

Management of poultry farm and hatchery operation. Prerequisite: Poultry Science 351. Offered in the Spring.

120-556. Processing and Marketing of Poultry Products Credit 3(2-2)

Methods of killing, dressing, grading and storage of poultry meats and the grading and storage of eggs. Transportation of poultry products and factors influencing price. Offered in the Spring.

120-557. Poultry Anatomy and Physiology Credit 3(2-2)

A course which deals with the structure and function of tissues, organs, and systems of the domestic fowl. Prerequisite: Poultry Science 351. Offered in alternating Spring and Summers.

120-559. Special Problems in Poultry Credit 3(3-0)

Assignment of work along special lines in which a student may be interested, given largely by project method for individuals in Poultry Science. Prerequisite: Three advanced courses in Poultry Science. Offered in the Fall.

120-750. Poultry Research Credit 3(0-6)

Offered in alternating Summers.

LABORATORY ANIMAL SCIENCE

120-161. Orientation I Credit 1(1-0)

A general orientation to college academic life with consideration for program demands, learning techniques and resources.

120-162 Introduction to Laboratory Animal Science Credit 3(3-0)

An introduction to the field of Laboratory Animal Science which includes ethical considerations, history of use, laws and guidelines associated with use of laboratory animals.

120-261 Medical Terminology Credit 3(3-0)

An introduction to medical terminology with emphasis on vocabulary building using Latin and Greek prefixes, suffixes, word roots and combining forms.

120-361 Integrated Anatomy Credit 4(3-3)

Origin, development, and structure of bio-systems in laboratory animals, food animals and companion animals. Prerequisite: Laboratory Animal Science 162.

120-362 Microscopic Anatomy Credit 3(2-3)

Microscopic studies of cells and tissues of laboratory animals, food animals and companion animals. Prerequisite: Laboratory Animal Science 361.

120-363 Internship I Credit 6(6-0)

On campus preparation and field experiences with Laboratory Animal Sciences activities. Prerequisite: Junior standing and special departmental permission.

120-365 Biology, Diseases and Care of Laboratory Animals Credit 4(3-3)

The biology, diseases and care of laboratory animals used in research, teaching, and testing. Study of behavior of common laboratory animals; handling, restraint; necropsy and diagnostic procedures: anesthesia, aseptic surgical.

120-461 Physiology of Domestic Animals Credit 3(2-3)

Study of function of bio-systems in laboratory animals farm animals and companion animals. Prerequisite: Laboratory Animal Science 361.

120-462. Principles of Medical Science Credit 3(3-0)

Discussion of basic topics which provide insight to causative agents in disease and resultant biological reactions, economic losses, and decrease performance levels. Prerequisite: Microbiology 121.

120-463. Internship II Credit 6(6-0)

Field experiences in Veterinary Medical activities. Prerequisite: LAS 363 and special departmental permission.

120-562. Environmental Toxicology Credit 3(2-3)

Study of toxic principles and identification of poisonous plants, study of toxicity in agricultural chemicals, animal feeds and other biohazards. Prerequisite: LAS 462.

120-563. Laboratory Animal Management and Clinical Techniques Credit 3(2-6)

A practical experience in managing animal colonies and in diagnostic laboratory procedures. Prerequisite: Senior standing.

120-564. Introduction to Research Credit 3(2-3)

An introductory course in biomedical research techniques including the fundamental of laboratory investigations, precepts of the scientific method and experimental design, and the application of scientific instrumentation. Prerequisite: Senior standing.

120-569. Seminar in Laboratory Animal Science Credit 1(1-0)

Discussion of Current Topics in Laboratory Animal Science

120-660. Special Problems in Specimen Preparation Credit 3(1-6)

The preparation of animal models for classroom, museum, and special display purpose. Prerequisite: Senior standing.

120-661. Special Problems in Electron Microscopy Credit 3(1-6)

Theoretical and practical aspects of electron and light microscopy. Prerequisite: Senior standing.

120-662. Special Problems in Radiology Credit 3(1-6)

Theoretical and practical aspects of radiology. Prerequisite: Senior standing.

120-663. Special Problems in Tissue Culture & Histochemistry Credit 3(1-6)

Theoretical and practical aspects of Tissue Culture and Histochemistry. Prerequisite: Senior standing.

120-664. Special Problems in Immunological Techniques Credit 3(1-6)

Theoretical and practical aspects of Immunological Techniques including Hybridoma Technology. Prerequisite: Senior standing.

DEPARTMENT OF HOME ECONOMICS
Harold Mazyck, Chairperson

Undergraduate

170-101. Introduction to Home Economics Credit 1(1-0)

A course designed to assist students in making personal adjustment to college living; an introduction to the broad areas of home economics; a study of the home economics curricula and professional opportunities in the field. Required of all home economics majors.

170-104. The Individual and His Family in Contemporary Society Credit 3(3-0)

Individual development in the family. The changing needs and roles of individuals due to emerging social forces. The role of the Home Economics professional in developing strategies for successful families.

170-105. Etiquette in Today's Society Credit 1(1-0)

An overview of the role of etiquette in today's world, emphasizing planning, preparation and execution for special occasions.

170-122. Clothing in Contemporary Environment Credit 2(2-0)

A basic study of the social, psychological, and economic influences on contemporary fashion; the selection, care and maintenance of apparel of the family.

170-123. Textiles Credit 3(2-2)

An introduction to the study of textiles, their sources, characteristics and production; the performance, use and care of fabrics.

170-126. Theory and Fundamentals of Fashion Illustration Credit 3(3-0)

Study of the theory and development of fashion sketching techniques, including the sources of design.

170-130. Food Preparation Credit 3(1-4)

Basic principles and techniques used in food preparation and preservation to develop skills in planning, preparation, and serving nutritious meals for the family.

170-133. Family Food Credit 3(2-2)

A study of the application of elementary principles of nutrition and cookery to the planning, preparation and serving of simple meals designed to meet the needs of all family members.

170-135. Food and Man's Survival Credit 3(3-0)

Acquaint students with the most common information regarding foods, nutrition and health, with attempts to dispel misconceptions about food properties and factors affecting the quality of foods. Areas of discussion include man's struggle for foods; chemical additives and food safety; modern food preservation, organic and health foods; nutrition and the consumer.

170-200. Introduction to Home Economics Education Credit 2(2-0)

Historical background, philosophy and objectives of education in the United States; educational, social and political movements affecting vocational education in the public schools with emphasis on the requirements of North Carolina.

170-236. Introduction to Food Science Credit 3(2-2)

An introductory study of the nature of raw foods and behavior of food components during handling and processing. Key methods and principles of food preservation will also be discussed.

170-300. Program Planning in Home Economics K-12 Credit 3(3-0)

Planning home economics programs for occupational education in public schools K-12. (Career awareness, middle school, exploratory, comprehensive occupational home economics, youth and adult program.)

170-301. Health and Home Nursing Credit 2(2-0)

Principles and attitudes in home care of the sick, the handicapped, and the aged; prevention of illness and promotion of health; prenatal care; preventing home accidents.

170-310. Introduction to Human Development Credit 3(3-0)

Introduction to the life span, prenatal, childhood, adolescence, adulthood, aging and death, as a developmental process. The social psychological, cognitive, physical, and moral characteristics of each stage are studied.

170-311. Child Development: Prenatal through Middle Childhood Credit 3(2-2)

A study of the child's sequential development at different stages - conception through late childhood. Historical and theoretical approaches to child development programs for young children. Laboratory observation required.

170-312. Adolescence and Young Adulthood Credit 3(3-0)

A comprehensive study of the physical, mental, and psychological factors of development from late childhood through adulthood. Observation required. Prerequisite: Home Economics or instructor's permission.

170-313. Adulthood Credit 3(3-0)

Study of the unique characteristics of life in the middle and later years. Analysis of the aging process. Special emphasis on physical, intellectual, personal, family, social and psychological development in the middle and later years. Impact of the economical and political process will be included. Prerequisite: Sociology 100.

170-314. Human Ecology of the Family Credit 3(3-0)

The family as environment and within environment. Relations of values, goals, standards, and decision-making in the management of the family. The unique role of the family in the social, economic, and political systems. Prerequisite: Sociology 100.

170-321. Basic Clothing Construction Credit 4(1-6)

Fundamental principles of clothing construction based on the use of the commercial pattern. Emphasis is placed on fitting alterations and basic construction skills. Laboratory experiences encourage self-paced instruction.

- 170-323. Home Furnishing Laboratory** Credit 3(1-4)
Instruction in various crafts and hobbies, including crocheting, knitting, macrame and needlepoint.
- 170-331. Meal Management** Credit 2(1-2)
Consideration of the management of human and physical resources in the planning, preparing and serving of meals to meet the needs of families of varying sizes, incomes and ages. Prerequisites: Home Economics 130.
- 170-332. Cultural Aspects of Food** Credit 2(2-0)
A study of the influence of cultural and socio-economics factors on food patterns and nutritional status of selected ethnic groups.
- 170-337. Introduction to Human Nutrition** Credit 3(2-2)
An introductory approach to the principles of nutrition as they relate to human requirements for food nutrients; significance and mechanism through which nutrients meet these biological needs during the life cycle. Prerequisites: Chemistry 105, 115 and Biology 461.
- 170-338. Diet Therapy** Credit 3(2-2)
A study of dietary modifications necessary in the treatment of pathologic conditions. Prerequisite: Home Economics 337.
- 170-344. Institution Organization and Management I** Credit 3(3-0)
A study of the organization, management and administration of food service establishments.
- 170-345. Institution Organization and Management II** Credit 3(3-0)
A continuation of Home Economics 344 with emphasis on personnel management.
- 170-346. Institution Purchasing** Credit 3(2-2)
A study of the problems involved in the purchase of food and other expendable supplies for food service establishments.
- 170-400. Contemporary Housing** Credit 3(2-2)
A study of problems in house planning to meet family needs. Emphasis is placed on the study of house designs, methods of financing and location.
- 170-401. Family Relations** Credit 3(3-0)
Mate selection, adjustments in marriage, parenting throughout the family life cycle, and aging.
- 170-403. Consumer Problems** Credit 3(3-0)
Basic principles involved in managing personal and family finances with emphasis on buying and consumption practices.
- 170-410. Practicum in Child Care** Credit 6(2-8)
Six child care competencies are required for the Child Development Associate credential to be awarded by the National Consortium credentialing office. The student will demonstrate mastery of each competency. Prerequisite: Only Continuing Education students may enroll.
- 170-414. Material, Methods and Evaluation I** Credit 3(2-2)
Materials, methods, and evaluations used in the development of cognitive, affective, and psychomotor behaviors. Focus areas: Language Arts, Creative and Dramatic Arts. Laboratory experiences required. Prerequisite: Home Economics 311.
- 170-415. Materials, Methods and Evaluation II** Credit 3(2-2)
Materials, methods, and evaluations used in the development of cognitive, affective, and psychomotor behaviors. Focus areas: Social Studies, Science, Math, Health and Safety. Prerequisite: Home Economics 414.
- 170-416. Play Materials and Equipment for the Preschool Child** Credit 3(3-0)
The importance of play in all aspects of child development as related to cognitive, affective, and psychomotor behaviors. Play materials, equipment, and their uses in a functional school environment will be explored. Prerequisites: Home Economics 414, 415.
- 170-417. Parent Education** Credit 3(3-0)
Parental interactions in the child's development at home, in the school and in the community. The effective use of assistance and volunteers in the school environment. Elements of creative parenting in a rapidly changing social environment.
- 170-418. Curriculum in Preschool Education** Credit 3(3-0)
Curriculum planning, the integrated day, scheduling, room arrangement and the classroom environment. Prerequisites: Home Economics 414, 415, 416.
- 170-419. Practicum in Community Service** Credit 3(1-4)
Practical field experiences in community service agencies concerned with all areas of child care and family development. Emphasis will be placed on services to young children.
- 170-420. Day Care Services** Credit 3(3-0)
A study of the organization, administration, operation and licensing of day care services. Community personnel, services and facilities will be incorporated in the study of current issues related to day care. Field observation required. Prerequisite: Home Economics 311.
- 170-421. The Cognitively Oriented Preschool Curriculum** Credit 3(3-0)
Methods, materials, and strategies in preschool education as found in the Cognitively Oriented Curriculum. Emphasis will be placed on development of skills in teaching.
- 170-422. Creative Dress Design and Pattern study** Credit 4(1-6)
The application of art principles in creating dress design by the methods of draping and flat pattern making. Prerequisites: Home Economics 122, 123, 321.
- 170-423. Contemporary and Traditional Methods of Tailoring** Credit 4(1-6)
The application of advanced construction and soft tailoring techniques toward the development of garments for personal use. Laboratory experiences will contrast the two techniques and emphasize the use of wool and other woven fabrics. Prerequisites: Home Economics 122, 123, 321, or consent of instructor.
- 170-424. Historic Developments of Costume and Textiles** Credit 3(3-0)
An introduction to the study of textiles and costume from ancient to modern times. Prerequisites: Foreign Language requirement and Home Economics 122, 123.
- 170-425. Fashion Motivation** Credit 3(3-0)
The study of the interaction of the social, psychological, and economic aspects of dress. Prerequisites: Home Economics 424; Psychology 320; Anthropology 200 or 300.

- 170-426. Problems in Clothing** **Credit 3(3-0)**
Independent study in special problems in selected areas of clothing. Prerequisite: Permission of instructor. Prerequisites: Home Economics 403, 424, 425.
- 170-427. Problems in Textiles** **Credit 3(3-0)**
Independent study in special problems in selected areas of textiles. Prerequisite:
- 170-428. Problems in Fashion Merchandising** **Credit 3(3-0)**
Independent study in special problems in selected areas of fashion merchandising. Prerequisite: Home Economics 426, 403, 425 and Business Administration 360.
- 170-437. Cooperative Training in Industry I** **Var. Credit (1-6)**
Student must be in industry full time one semester or summer in his major field of work, and complete the University Co-op requirements. He will be evaluated on reports from industry and a University coordinator. Twelve credit hours is the maximum to be earned in the Co-op arrangement that can be used as electives toward degree programs in the School of Agriculture.
- 170-439. Clinical Nutrition** **Credit 3(2-2)**
Principles of nutritional sciences in the treatment and management of nutrition related diseases. Focus on etiology, prevalence, pathophysiology and nutritional care of these health problems. Prerequisites: Chemistry 251, 252, Home Economics 337.
- 170-447. Institution Equipment** **Credit 3(1-4)**
A study of the selection, care and use of equipment for quantity food preparation and service. Interpretation of blueprints and specifications will be considered.
- 170-448. Quantity Cookery** **Credit 4(1-6)**
The application of the principles of cookery to the preparation and service of food for group feeding with emphasis on menu planning, work schedules, cost and portion control. Prerequisite: Home Economics 130.
- 170-500. Occupational Home Economics** **Credit 3(1-4)**
Organization and administration of occupational wage-earning programs at the upper high school level-methods and instructional media. Work experiences required in at least one area of home economics occupational cluster.
- 170-502. Household Equipment** **Credit 2(1-2)**
The application of principles and techniques relating to selection, care and use of household equipment.
- 170-503. Concepts in Esthetic Ecology** **Credit 3(2-2)**
A study of housing and interior requirements for individuals and families with a focus on plans, designs, furnishings and aesthetics.
- 170-505. Home Management Residence** **Credit 3(1-4)**
Designed to give students experiences in applying the principles of management and interpersonal relations to group living. Prerequisite: Home Economics 331 or concurrent.
- 170-519. Practicum in the Preschool** **Credit 6(1-10)**
Practice teaching with a group of preschool children. Prerequisites: Home Economics 414, 415, 416, 418, 420, 421.
- 170-521. Field Experience** **Credit 4(0-8)**
A course designed to give the student practical experiences in the area of clothing, or fashion merchandising. Prerequisites: Home Economics 321, 403; Business Administration 360.
- 170-522. Food Engineering** **Credit 3(2-2)**
Fundamentals of heat transfer, fluid flow, refrigeration, evaporation and other unit operations in the food processing industry. Application of engineering principles and concepts to the processing of foods. Prerequisite: Physics 201 or 225.
- 170-523. Seminar in Fashion Apparel Fundamentals** **Credit 4(2-4)**
Discussion of current trends in fashion apparel, fashion coordination and analysis of the functions of fashion merchandising, field trips to fashion centers. Prerequisite: Permission of instructor.
- 170-525. Fashion Marketing and Merchandising** **Credit 3(3-0)**
Emphasis is placed on the functions and responsibilities of the fashion merchandiser, considering various retail establishments. A synthesis of business knowledge and its application to the fashion field.
- 170-541. Food Packaging** **Credit 2(2-0)**
Characteristics of packaging materials, strength, elasticity, permeability, food packaging machines, adhesives, as related to product wholesomeness and package design as a form of advertising. Prerequisite: Chemistry 102 or 107.
- 170-544. Field Experience in Food Administration** **Credit 3(0-6)**
Individualized experiences in off-campus food service establishments.
- 170-547. Cooperative Training in Industry II** **Var. Credit (1-6)**
The description of this course is the same as Home Economics 437, and is normally the second Co-op experience of the student.
- 170-549. Food Consultation for Older Adults** **Credit 3(3-0)**
Techniques of consultation with older adults and providers of services to older adults on diets, food choices, food fads, planning, purchasing, and preparational procedures. Menus for limited incomes will be emphasized.
- 170-602. Adult Education in Home Economics** **Credit 3(3-0)**
An overview of adult homemaking education: organization, program planning, teaching techniques and evaluation. Laboratory experience will be provided by working with out-of-school groups.
- 170-603. Special Problems in Home Economics I** **Credit 3(1-4)**
Problems in the various areas of home economics may be chosen for individual study.
- 170-604. Seminar in Home Economics Education** **Credit 3(3-0)**
Consideration of problems resulting from the impact of social change on the various fields of home economics, review research and professional development.

- 170-605. Home Economics Summer Study Abroad** Credit 6(0-12)
A course designed to provide opportunity for students and specialists to study historic and contemporary points of interest abroad. Exposure to customs, cultures and industries in an international setting will provide the basis for broader background and experiences in selected areas of home economics.
- 170-606. Cooperative Extension** Credit 3(3-0)
Introduction to the organization, philosophy, financing, personnel, clientele, and programs of Cooperative Extension Service.
- 170-607. Cooperative Extension—Field Experience** Credit 3(0-6)
Field experience to provide opportunity for students to become acquainted with the role of county personnel, office organization and programs in Cooperative Extension Service. Prerequisite: Home Economics 606.
- 170-608. Teaching Adults and Youth in Out-of-School Groups** Credit 3(0-6)
The design and development of informal educational programs for youth and adults in out-of-school settings. Prerequisite: Home Economics 606.
- 170-612. Senior Seminar** Credit 3(3-0)
Student review and presentation of major research findings in the various disciplines of home economics. (Required of home economics majors.) Prerequisite: Senior year only.
- 170-613. Substance Abuse** Credit 3(3-0)
Alcoholism and drugs and their inherent effects upon the family and society. Problems in the family, related to the individuals, business and industry. Additional focus will be given to treatment, agencies and methods of recovering self-esteem.
- 170-614. An Integrative Approach to Home Economics** Credit 3(2-2)
Contemporary issues of the family in relation to clothing, child development, food, nutrition, and resource management. Application of high technology in identifying, analyzing and managing individual and group problems will be emphasized. (Required of all Home Economics major). Prerequisite: Junior year.
- 170-618. Food Technology Seminar** Credit 1(1-0)
A review and discussion of selected topics and recent advances in the fields of animal and food science. Prerequisite: Senior standing.
- 170-625. Experimental Clothing and Textiles** Credit 3(1-4)
Independent experimentation with new fabrics and finishes, including furs and leathers. Prerequisite: Permission of instructor.
- 170-626. Tailoring** Credit 4(2-4)
A study of the principles of hard tailoring with emphasis on comparing the various methods and analyzing tailored garments.
- 170-630. Advanced Nutrition** Credit 3(3-0)
Intermediate metabolism and interrelationships of organic and inorganic food nutrients in human biochemical functions. Prerequisites: Home Economics 337; Chemistry 251, 252 or equivalent.
- 170-631. Food Chemistry** Credit 3(2-2)
A study of food components, their interaction and reactions with emphasis on biochemical changes in fruits and vegetables on post harvest storage, postmortem biochemical changes in meat and fish, browning reactions, lipid oxidation and other chemical alterations in foods. Prerequisite: Home Economics 236.
- 170-632. Maternal and Development Nutrition** Credit 3(3-0)
Maternal nutrient requirements and feeding practices at various phases of growth periods. Influences of nutrition on growth and development of preschool and early elementary children. Focus on nutrition, learning and growth assessments. Guidelines to assess the nutritional quality of the food and physiological developments.
- 170-633. Food Analysis** Credit 3(1-4)
Fundamental chemical, physical and sensory aspects of food composition as they related to physical properties, acceptability and nutritional values of foods. Prerequisites: Chemistry 102, 112; Home Economics 236.
- 170-635. Introduction to Research Methods in Food and Nutrition** Credit 3(0-6)
Laboratory experiences in the use of methods applicable to food and nutrition research. Prerequisite: Consent of the instructor.
- 170-636. Food Promotion** Credit 4(1-6)
A course which gives experiences in the development and testing of recipes. Opportunities will be provided for demonstrations, writing, and photography with selected business.
- 170-637. Special Problems in Food, Nutrition or Food Science** Credit 3(0-6)
Independent study/research in the areas of Food, Nutrition or Food Science. Prerequisites: Junior, senior, graduate standing, and consent of instructor.
- 170-638. Sensory Evaluation** Credit 3(2-2)
A study of the color, flavor, aroma and texture of foods by the use of sensory evaluation methods. Prerequisites: Home Economics 236 and 337.
- 170-640. Geriatric Nutrition** Credit 3(3-0)
Multidisciplinary approaches to geriatric foods, nutrition and health problems. Evaluation of nutritional status and nutrition care of the elderly are emphasized. Field experience: nursing home and other community agencies. Prerequisite: Home Economics 337 or 439.
- 170-641. Current Trends in Food Science** Credit 3(3-0)
Recent developments in food science and their implications for food scientists, nutritionists, dietitians and other professional in the food industry and related professions.
- 170-643. Food Preservation** Credit 3(2-2)
A study of current methods of preserving foods - canning, freezing, dehydration, radiation, and fermentation. Prerequisite: Home Economics 236 or equivalent.
- 170-645. Special Problems in Food Administration** Credit 2(0-4)
Individual work on special problems in food administration.

170-646. Readings in Food Administration **Credit 1(1-0)**

A study of food administration through reports and discussion of articles in current trade periodicals and scientific journals.

170-648. Community Nutrition **Credit 3(3-0)**

Materials, methods, and goals in planning, organizing and conducting nutritional status surveys. Evaluation of food and nutrition programs at state and federal levels. Prerequisites: Math 224 or Sociology 303; Home Economics 337 or equivalent.

170-650. International Nutrition **Credit 3(3-0)**

An ecological approach to the hunger and malnutrition in technologically developed and developing countries. Focus on integrated intervention programs, projects, and problems. Opportunities to participate in national and international internships through cooperative arrangements.

170-664. Occupational Exploration in Middle Grades **Credit 3(3-0)**

Designed for persons who teach or plan to teach middle grades occupational exploration in the curriculum, sources and uses of occupational information, approaches to middle grades teaching, and philosophy and concepts of occupational education. This course will be taught in cooperation with the Department of Business Education and Administrative Services, Home Economics and Industrial Education.

170-665. Occupational Exploration in the Middle Grade—Home Economics **Credit 3(3-0)**

Emphasis is placed on curriculum, methods and techniques of teaching, and resources and facilities for teaching in the service occupations cluster which involves the areas of consumer and homemaking education, personal service, public service, hospitality and recreation, and health occupations.

170-679. Nutrition Education **Credit 3(3-0)**

Philosophy, principles, methods and materials involved in nutrition education. Application of nutrition knowledge and skills in the development of the nutrition education curriculum and programs in schools and communities.

DEPARTMENT OF PLANT SCIENCE
Samuel Dunn, Chairperson

PLANT SCIENCE AND TECHNOLOGY

Undergraduate

130-110. Plant Science I **Credit 3(2-2)**

An introduction to the basic principles underlying the production of economic crops. Brief introduction to drug and medicinal plants. Prerequisite: Botany 140.

130-300. Plant Science II **Credit 3(2-2)**

History, classification, culture and utilization of economic plants; basic physical, economical and social conditions relating to their growth, distribution and improvement. Prerequisite: Plant Science 338.

130-520. Seminar in Plant Science and Technology **Credit 1(1-0)**

Current problems in Plant Science and Technology. Designed especially for unifying the three major areas of the department by involving both the staff and junior and senior students.

130-618. General Forestry **Credit 3(2-2)**

History, classification, culture, and utilization of native trees, with special emphasis on their importance as a conservation resource and the making of national forestry policy, and the ecological impact of trees on environmental quality. Prerequisite: Botany 140.

AGRICULTURAL ENGINEERING

Undergraduate

130-100. Introduction to Agricultural Engineering **Credit 3(3-0)**

This course is designed to acquaint students with a wide range of applications of engineering principles to agriculture and to enhance the problem-solving ability of the student. Subject matters will include concept of force, torque, work, power, basic electricity and fluid characteristics; equipment efficiency, calibration and reliability.

130-113. Agricultural Drawing **Credit 3(0-6)**

Lettering, use of instruments, projection drawing, auxiliaries, dimensioning, isometric drawing, working drawings—structural, and graphics (charts and graphs).

130-114. Home and Farm Maintenance **Credit 3(1-4)**

Selection, sharpening, care and correct use of shop tools and equipment; woodworking and simple carpentry; simple electrical repairs; sheet metal work; electric arc and oxyacetylene welding; pipe fitting and simple plumbing repairs.

130-303. Field Machinery **Credit 3(1-4)**

Principles of operation, selection and the study of field machinery efficiency.

130-304. Structures and Environment **Credit 3(1-4)**

Fundamentals of building construction, applied to location selection of materials, foundations, planning farm structures and environmental considerations such as temperature, humidity, condensation and ventilation.

130-401. Surveying, Practices and Principles **Credit 3(1-4)**

Principles of surveying (instrumentation-area computations) drainage, planning of soil erosion and drainage systems, based on topographical and soil requirements. (Prerequisite: Math 132)

130-402. Farm Power **Credit 3(1-4)**

Principles of mechanical power, use, care and adjustment of internal combustion engines. Prerequisite: Physics 225.

130-410. General Hydrology **Credit 3(2-2)**

This course uses various techniques to illustrate the development of methods that may be used to obtain certain hydrologic data that might not be readily available. These methods will be used to solve hydrological problems in different locations. The problems will include determining peak runoff rate and runoff volume, developing runoff hydrographs, basic open-channel hydraulics, stream flow, evapotranspiration, rainfall, flood routing, etc. Beneficial to students in water resources, civil engineering, and agricultural engineering. Prerequisites: Math 132 and Earth Science 330.

130-522. Dairy/Food Engineering **Credit 3(2-2)**

The general engineering principles of solids, fluids, and process equipment will be discussed. Topics include energy, heat, enthalpy, psychrometrics, heat and mass transfer, drying and refrigeration of food products. Prerequisite: M.E. 441.

130-523. Electric Power **Credit 3(2-2)**

The study of electricity, electrical wiring, and electrical devices including motors, with particular emphasis upon the relation of these to the home and farm. Prerequisite: EE 441.

130-524. Agricultural Water Resources Development Distribution and Quality **Credit 3(2-2)**

The planning and installation of farm water, such as source, quantity, quality, treatment and sanitation systems. Prerequisites: Math. 132, ME 416 or Ag. Engr. 410.

130-525. Farm Shop Organization and Management **Credit 3(1-4)**

A course designed for prospective and in-service teachers of vocational agriculture; includes presentation of purpose, plans and equipment of shops, organization of course of study and methods of teaching. Prerequisite: Ag. Engr. 114; Ag. Ed. 501.

Advanced Undergraduate and Graduate

130-600. Conservation, Drainage and Irrigation **Credit 3(1-4)**

Improvement of soil by use and study of conservation practices, engineering structures, and irrigation systems. Prerequisite: Ag. Engr. 4011.

130-601. Advanced Farm Shop **Credit 3(1-4)**

Study of the care, operation, and maintenance of farm shop power equipment. Prerequisite: Ag. Engr. 114.

130-602. Special Problems in Agricultural Engineering **Credit 3(0-6)**

Special work in agricultural engineering on problems of special interest to the student. Open to seniors in Agricultural Engineering.

130-619. Instrumentation and Measurement **Credit 3(2-2)**

This course will emphasize quantitative evaluation of some of the well established parameters such as: temperature, humidity, fluid flow, pressure, displacement, velocity, acceleration, force, stress, strain, etc. that are widely used in the area of Agricultural Engineering. Prerequisite: Physics 222, Mech. Eng. 336.

CROP SCIENCE

Undergraduate

130-305. Principles of Plant Breeding **Credit 3(2-2)**

An introductory course with emphasis placed on basic principles of plant improvement through genetics; required of all Plant Science majors. Pre-requisite: Biology 140—General Botany or Animal Science 214—Agricultural Genetics.

130-307. Forage Crops **Credit 3(2-2)**

Grasses, legumes and other plants and their uses as hay, pasture, silage and special purposes of forages, identification of plants and seeds and study of quality in hay, silage and pasture population. Prerequisite: Plant Science 110.

130-405. Determining Crop Quality **Credit 4(2-4)**

The recognition of high quality crop products as influenced by growth and maturity factors, weeds and diseases, determination of commercial quality through study, land use and grades; identification of crops, planning crop exhibits. Prerequisite: Plant Science 300.

130-603. Plant Chemicals **Credit 3(2-2)**

A study of the important chemical pesticides and growth regulators used in the production of economic plants. Prerequisites: Chemistry 102 and Plant Science 300.

130-604. Crop Ecology **Credit 3(3-0)**

The physical environment and its influence on crops; geographical distribution of crops.

130-605. Breeding of Crop Plants **Credit 3(2-2)**

Significance of crop improvements in the maintenance of crop yields; application of genetic principles and techniques used in the improvement of crops; the place of seed certification in the maintenance of varietal purity.

130-606. Special Problems in Crops **Credit 3(3-0)**

Designed for students who desire to study special problems in crops. Repeatable for a maximum of six credits. Prerequisite: By consent of instructor.

130-607. Research Design and Analysis **Credit 3(2-2)**

Experimental designs, methods and techniques of experimentation; application of experimental design to plant and animal research; interpretation of experimental data. Prerequisites: Agricultural Economics 644, Mathematics 224.

EARTH AND ENVIRONMENTAL SCIENCE

Undergraduate

130-201. The Earth—Man's Environment **Credit 3(2-2)**

A study of the earth's physical environment as related to climate, natural resources and physiography. The interrelationship of man with the earth's environment as revealed in the modification of natural processes. No prerequisite.

130-309. Elements of Physical Geology **Credit 3(2-2)**

Relation of geological principles in the development of a balanced concept of the earth and earth history; rock and mineral identification, utilization of geological and topography maps, geological processes, resource conservation, urban and environmental problems. Prerequisite: Chemistry 101 or consent of instructor.

130-330. Elements of Weather and Climate **Credit 3(2-2)**

A study of the fundamental elements of weather conditions as revealed in world patterns of climate types. This course surveys the types of land forms and makes applications to problems in engineering, military science and in planning for agricultural, urban and regional development projects. Prerequisite: Earth Science 309; Soil Science 338, or consent of instructor.

130-408. Aerial Photointerpretation **Credit 3(1-4)**

The interpretation of aerial photography as an aid to the study of terrains of all types. This course surveys the types of land forms and makes applications to problems in engineering, military science and in planning for agricultural, urban and regional developmental projects. Prerequisites: Earth Science 309, Soil Science 338, or consent of instructor.

Advanced Undergraduate and Graduate

130-616. Environmental Planning and Natural Resources Management Credit 3(2-2)

Problems of uncontrolled use of natural resources, increased urbanization, unplanned growth and general deterioration of the man-made and natural environments; basic principles of environmental planning and natural resources management.

130-622. Environmental Sanitation and Waste Management Credit 3(2-2)

Study of traditional and innovative patterns and problems of managing and handling waste products of urban and rural environments, their renovation and reclamation.

130-624. Earth Science, Geomorphology Credit 3(2-2)

Various land forms and their evolution—the naturally evolved surface features of the Earth's crust and the processes responsible for their evaluation, their relation to man's activities and as the foundation for understanding the environment.

130-625. Earth Resources Credit 3(2-2)

Conservation, management and use of renewable and non-renewable resources. Their impact on the social and economic quality of our environment.

130-626. Aquaculture Credit 3(2-2)

Using water as a natural resource in the production of food, for recreation, and wildlife preservation, and its management as it relates to environmental problems affecting water quality, with emphasis on freshwater lakes and ponds.

130-627. Strategies of Conservation Credit 3(2-2)

An approach to the teaching of environmental conservation as an integral part of the general curriculum.

HORTICULTURE

Undergraduate

130-118. Amateur Floriculture Credit 3(2-2)

General principles of growing flowers on a small scale in small greenhouses, home, school and public buildings; growing flowers outside for landscape effect and cutting. Course designed for non-majors.

130-119. The Functional Usage of Plant Materials Credit 3(0-6)

The use of plants and related materials to enhance temporary settings with emphasis on the utilization of horticulture plant materials indoor and out-of-doors. Special attention to be given to temporary gardens, planters, interior scenes and designs. No prerequisite.

130-334. Plant Propagation Credit 3(2-2)

Study of types, construction, and management of propagation structures; fundamental principles of propagation by seed, cuttage, budding, grafting, and layerage. Prerequisite: Plant Science 110.

130-335. Principles of Landscape Design Credit 3(2-2)

Fundamentals of design of planning the arrangement of small properties, such as homes, schools, small parks and playgrounds.

130-514. Nursery Management Credit 3(2-2)

Planning, operations and methods used by wholesale, retail, and landscape nurseries. Emphasis on cultural practices, records and selling techniques. Prerequisite: Horticulture 334.

130-527. Basic Floral Design Credit 3(1-4)

Essentials of flower arrangement and plant decoration for the home, office, hospital, school and church. Special attention given to design principles such as balance, scale, harmony, color, and line movement.

130-528. Flower Shop Management Credit 3(2-2)

Designing, planning handling of merchandise, buying and selling methods, and general policies. Special attention given to site selection, building style, layout and personnel.

130-529. Landscape Design and Construction I Credit 3(0-6)

Problems in design of land areas with emphasis on orientation, arrangement, and circulation. Instruction in planning, presentation, cost accounting, and construction. Prerequisite: Horticulture 335.

130-530. Landscape Design and Construction II Credit 3(0-6)

Continuation of Horticulture 529. Problems in design of larger land areas involving more complex features; practice in landscape model construction. Prerequisite: Horticulture 529.

Advanced Undergraduate and Graduate

130-608. Special Problems in Horticulture Credit 3(3-0)

Work along special lines given largely by the project method for advanced undergraduate and graduate students who have the necessary preparation. Special arrangement with instructor required.

130-610. Commercial Greenhouse Production I Credit 3(2-2)

Culture of floriculture crops in the greenhouse out-of-doors with emphasis on cut flowers and potted plants. Special attention given to seasonal production as it relates to soils, fertilization and environmental factors.

130-611. Commercial Greenhouse Production II Credit 3(2-2)

Culture of floriculture crops in the greenhouse with emphasis on seasonal production, marketing, insect and disease control and plant growing structures. Prerequisites: Horticulture 334 and Horticulture 610.

130-612. Plant Materials and Landscape Maintenance Credit 3(2-2)

Identification, merits, adaptability, and maintenance of shrubs, trees, and vines used in landscape planting trees, shrubs, bulbs, and perennials.

130-613. Plant Materials and Planning Design Credit 3(2-2)

Continuation of Horticulture 612 with added emphasis on plant combinations and use of plant as design elements.

SOIL SCIENCE

Undergraduate

130-338. Fundamentals of Soil Science Credit 4(2-4)

The fundamental nature and properties of soils and introductory treatment of soil genesis, morphology, and classification and land use.

130-516. Soil Pedology Credit 3(3-0)

A detailed examination of theories and concepts concerning the processes of soil formation and their relationships to various classification schemes. In depth study of concepts treated in Soil Science 338. Prerequisites: Soil Science 338 and Chemistry 102.

130-517. Soil Fertility Credit 3(3-0)

General principles of soil fertility; influence of chemical, physical and microbiological properties of soils on crop production. Application of fertility principles in cropping programs. Limited treatment of impact of agricultural pollutants on the environment. Prerequisites: Soil Science 338, Chemistry 101 or consent of instructor.

130-518. Soil Fertility Laboratory Credit 2(0-4)

Analytical and diagnostic procedures in studying soil fertility problems. Some treatment of procedures useful for examination of problems resulting from agricultural pollutants. Prerequisites: Chemistry 102, Soil Science 338 and 517, or consent of instructor.

130-532. Soil Physics Credit 4(2-4)

A study of fundamental physical principles and laws which govern the behavior of soils. Physical constitution soil water, and soil air. The relationship of soil physical conditions to plant growth and engineering usage. Prerequisites: Soil Science 338, Chemistry 102, and Mathematics 113, and consent of instructor. Spring terms of even numbered years.

130-533. Soil Genesis and Classification Credit 4(2-4)

Soil genesis, morphology and classification of the major soil groups of the United States, techniques of making soil surveys; soil survey interpretation for agriculture and non-agricultural uses. Detailed treatment of the Seventh Approximation in soil classification. Prerequisites: Soil Science 338 and 516.

130-534. Soil Chemistry Credit 4(2-4)

Application of physico-chemical principles to soil studies. Consideration of mineral composition, crystal structure, types of bonding, nutrient fixation and ion exchange. The geochemistry of soil pollution. Prerequisite: Chemistry 102, Soil Science 338, and consent of instructor. Spring of odd numbered years.

Advanced Undergraduate and Graduate

130-609. Special Problems in Soils Credit 3(3-0)

Research problems in soils for advanced students. Prerequisite: Consent of instructor.

LANDSCAPE ARCHITECTURE

100-101. Landscape Architectural Orientation Credit 1(1-1)

Lectures and seminars on the university and the field of Landscape Architecture.

100-202. Plant Materials I Credit 3(1-4)

Study of plant materials as used in landscape design. Emphasis on trees, shrubs, ground covers, and vines, native or introduced to North Carolina. Prerequisite: Botany 140.

100-203. Plant Materials II Credit 3(1-4)

Continuation of Horticulture 202, with different plant species. Prerequisite: Botany 140.

100-220. Visual Communication Credit 2(0-4)

Visual analysis of design elements and forms with emphasis on their function in design; visual analysis of landscape materials, landscape architectural presentation techniques.

100-230. Environmental Ecology Credit 3(3-0)

Basic concepts of ecology, eco-system structure and function; design-oriented study of the relation between natural systems and constructed systems. Field trips.

100-240. Basic Landscape Design I Credit 3(2-2)

Lectures and projects which explore the design potential of the environment, develop processes for problem solving and presentive ideas verbally and visually. Design of small sites with simple variables.

100-241. Basic Landscape Design II Credit 3(2-2)

A continuation of topics of L.A. 240.

100-310. History of Landscape Architecture Credit 3(3-0)

A study of the development of landscape architecture from antiquity to modern times, with emphasis on its relation to allied arts and professions.

100-330. Landscape Architectural Construction I Credit 4(0-8)

Lecture, exercises and projects in grading and earth volume computations, surface drainage techniques and construction drawings. Prerequisite: Admission to intermediate program, Mathematics 112 and Landscape Architecture major.

100-331. Landscape Architectural Construction II Credit 4(1-6)

Lectures and projects on landscape structures, selection of materials, their use in design, and development of construction drawings. Prerequisite: Landscape Architecture 330.

100-340. Intermediate Landscape Architectural Design I Credit 4(0-8)

Design problems involving private, semi-public and public area with emphasis on plan analysis, detail drawing and presentation. Prerequisites: Admission to intermediate program, Landscape Architecture 220 and 240.

100-341. Intermediate Landscape Architectural Design II Credit 4(0-8)

Continuation of Landscape Architecture 340 with concentration on urban problems. Prerequisite: Landscape Architecture 340.

100-400. Planting Design Credit 3(3-0)

Fundamentals of design as applied to the use of plant materials, with emphasis on aesthetic, and functional arrangements. Problems will include preparation of planting plans, cost estimates and technical specifications.

100-410. Professional Practice **Credit 2(2-0)**

A study of the professional practice of landscape architecture, including professional ethics and registration laws; the preparation of proposals and contract documents; office administration; job supervisions; and relationship with clients and contractors. Prerequisite: Landscape Architecture major, and consent of instructor.

100-420. Seminar **Credit 2(2-0)**

Individual research, group discussions, and lectures on contemporary issues relating to the practice of landscape architecture. Prerequisite: Senior Landscape Architecture major or consent of instructor.

100-440. Advanced Landscape Architectural Design I **Credit 4(0-8)**

In depth study of a comprehensive landscape architectural problem(s) involving existing situations. Research Preliminary studies conferences and presentation of recommendations. Prerequisite: Admission to advanced program, Landscape Architecture 341.

100-441. Advanced Landscape Architectural Design II **Credit 4(0-8)**

An approved design problem requiring individual work to serve as a comprehensive examination. Preparation and presentation to include a written and graphic analysis, detailed plans, specifications, cost estimates and model (or other means approved by instructor). Prerequisite: Landscape Architecture 440.

100-529. Advanced Landscape Architectural Construction **Credit 3(2-2)**

Advanced topics in landscape architecture construction including computer applications.

Advanced undergraduate and Graduate

100-601. Environmental Perception and Design Determinants **Credit 3(3-0)**

Comprehensive perception of natural forces as design determinants. An assessment of systems and methods of perception, classification, analysis and synthesis of natural forces and elements as they affect physical design and human use. Lecture and workshops will emphasize perception and landscape design.

100-602. Qualitative Analysis in Landscape Planning **Credit 3(3-0)**

Evolution and trends of applied physical design in landscape planning. Investigation of actual hypothetical design situations; study of visual and cultural values of landscape resources in planned environments. Lectures and practicums of physical design, site capabilities, landscape structuring, and landscape values.

100-603. Land-Use Planning and Management **Credit 3(3-0)**

A study of human behavioral responses and use patterns within physical environments, with emphasis on special group needs and compatibility with landscape resource areas. Consideration of problems affecting a synthesis of landscape values and design forms, visual and psychological values of planned and unplanned environments and relationships of social functions to landscape architectural forms.

100-604. Factors of Physical Design **Credit 3(3-0)**

A study of human behavioral responses and use patterns within physical environments, with emphasis on special group needs and compatibility with landscape resource areas. Consideration of problems affecting a synthesis of landscape values and design forms, visual and psychological values of planned and unplanned environments and relationships of social functions to landscape architectural forms.

COLLEGE OF ARTS AND SCIENCES

Ethel F. Taylor, Acting Dean

DEPARTMENT OF ART

LeRoy F. Holmes, Chairperson

Undergraduate

211-100. Basic Drawing and Composition **Credit 3(0-6)**
(Formerly Art 3200)

A study of the fundamental principles of drawing as a mode of visual expression. Selected problems involving basic consideration of line, form, space and composition are presented for analysis and laboratory practice.

211-101. Lettering and Poster Design **Credit 3(0-6)**
(Formerly Art 3201)

A comprehensive study of the art of letting. Projects involving the principles of layout, poster construction, and general advertising.

211-220. Graphic Presentation I **Credit 2(0-4)**
(Formerly Art 3220)

Exercises in various sketching techniques and media, including work with pencil, charcoal, crayon, and ink. Individual instruction is given using forms in nature and still life for art and architectural presentation. Prerequisite: Sophomore classification.

211-221. Graphic Presentation II **Credit 2(0-4)**
(Formerly Art 3221)

The theory of color mixture. Individual instruction in the techniques of watercolor painting for architectural presentation. Studies from nature and still life. Prerequisite: Art 220.

211-222. Watercolor **Credit 3(0-6)**
(Formerly Art 3222)

Experimental exploration of all aqueous media: watercolor, casein, gouache; their possibilities and limitations.

211-224. Art Appreciation **Credit 2(2-0)**
(Formerly Art 3224)

An introduction to the study of art. Basic qualities of various forms of artistic expression are explained. Emphasis is placed on the application of art principles in every day life.

211-225. An Introduction to the History of Art **Credit 2(2-0)**
(Formerly Art 3225)

A general introduction to the history of art, beginning with an examination of ancient art in terms of their extant monuments and culminating with the analysis and comparison of representative works of today.

- 211-226. Design I** **Credit 3(0-6)**
(Formerly Art 3226)
An introduction to visual design based upon an analysis of the aims, elements, principles, sources of design and their application in a variety of media.
- 211-227. Design II** **Credit 3(0-6)**
(Formerly Art 3227)
A continuation of Art 226 with consideration given to three dimensional as well as two dimensional problems. Students are encouraged in the experimental use of materials and are required to find individual and complete solutions to problems through various stages of research, planning, and presentation. Emphasis is placed on technical perfection and the development of professional attitudes.
- 211-228. Color Theory** **Credit 3(0-6)**
(Formerly Art 3228)
Problems directed toward understanding of color through creative experiment and application of color in visual organization. Use of slides, filmstrips, and trips.
- 211-229. Anatomy and Figure Drawing** **Credit 3(0-6)**
(Formerly Art 3229)
A study of the human figure with emphasis on anatomy, body structure and proportions, draped figures at rest and in action. Special emphasis is given to detailed studies, composition, and stylization.
- 211-400. Renaissance Art** **Credit 2(2-0)**
(Formerly Art 3240)
The study of the Renaissance in Italy and in major regions of northern and western Europe from 1300 to 1600.
- 211-401. Ceramics** **Credit 3(0-6)**
(Formerly Art 3241)
Introduction to sculptural form with the use of clay modeling, basic plaster techniques, wood, and metal in relation to the production of sculpture. Sculpting, decorating, glazing, and firing. Supplementary reading is required.
- 211-420. Basic Sculpture** **Credit 3(0-6)**
(Formerly Art 3242)
Introduction to sculptural form with the use of clay modeling, basic plaster techniques, wood, and metal in relation to the production of sculpture.
- 211-403. Jewelry and Metalwork** **Credit 3(0-6)**
(Formerly Art 3243)
The design and technical essentials of jewelry making and metalwork. Prerequisites: Art 226, 227.
- 211-405. Materials and Techniques** **Credit 3(0-6)**
(Formerly Art 3245)
A study of the materials of the artist; supports, ground, vehicles, binders, and protective covering. Exploration of the possibilities of various techniques of picture construction as a point of departure for individual expression.
- 211-406. Painting Techniques** **Credit 3(0-6)**
(Formerly Art 3246)
A continuation of Art 405 with further work in projects that explore the esthetic opportunities and problems implicit in the use of varying media. Work in tempura, gouache, casein, polymers, and lacquers.
- 211-450. Advertising Design I** **Credit 3(0-6)**
(Formerly Art 3250)
The study of basic tools of advertising design. Students are introduced to lettering techniques, layout problems, and reproduction processes for advertising, illustrations, posters, and television.
- 211-451. Advertising Design II** **Credit 3(0-6)**
(Formerly Art 3251)
Preparation and rendering of art work for reproduction from rough idea layouts to finished illustration. Creative and technical class work is augmented by visits to commercial studios and printing companies. Prerequisite: Art 450.
- 211-452. Commercial Art** **Credit 3(0-6)**
(Formerly Art 3252)
Illustration techniques. Different materials and renderings employed in advertising illustration, such as airbrush, colored inks, scratch board, etc. Attention is given to techniques of printing as far as they affect graphic design.
- 211-453. Typography** **Credit 3(0-6)**
(Formerly Art 3253)
The study of typography in relation to lettering advertising, and design. Prerequisites: Art 101 and 450.
- 211-454. General Crafts** **Credit 3(0-6)**
(Formerly Art 3254)
Introduction to craft processes; weaving, metalwork, leather, etc.
- 211-455. Fabric Design and Basic Weaving** **Credit 3(0-6)**
(Formerly Art 3255)
Basic principles of design as related to textiles and other flat surface decoration. The warping, threading, and weaving on small looms, History of fabric design and weaving. Prerequisites: Art 226, 227.
- 211-456. Fabric Painting and Weaving** **Credit 3(0-6)**
The emphasis is on printing techniques and designers' tools to achieve effective results and on the use of the large looms for creating interesting fabrics. Study of contemporary trends in weaving. Prerequisite: Art 226, 227, 455.
- 211-457. Stage Design and Marionette Production I** **Credit 3(0-6)**
(Formerly Art 3257)
Problems in scene design and stage setting with experiments in stage lighting. Attention is given to the designing and construction of marionettes for simple plays. Field trips and attendance at plays are required.
- 211-458. Stage Design and Marionette Production II** **Credit 3(0-6)**
A continuation of Art 457.
- 211-459. Baroque and Roccoco Art** **Credit 2(2-0)**
(Formerly Art 3259)
The study of art in Europe from 1600 to 1800.
- 211-520. Modern Art** **Credit 2(2-0)**
(Formerly Art 3260)
European and American Art from about 1875 to the present.

211-524. Introduction to Graphic Arts Credit 3(0-6)
(Formerly Art 3264)

Introduction to printmaking processes. Production of prints in varied media: linoleum, woodcuts, drypoint etchings, serigraphs, and lithographs.

211-525. Lithography and Serigraphy Credit 3(0-6)
(Formerly Art 3265)

Exploration of the techniques of lithography and serigraphy as a means of contemporary artistic expression. Emphasis of medium determined by individual interest.

211-526. Senior Project Credit 3(0-6)
(Formerly Art 3266)

Students who have given evidence of their ability to do serious individual work on a professional level may plan and carry out a project of their own choosing, subject to approval and supervision of a faculty member.

211-528. Painting I Credit 3(0-6)
(Formerly Art 3268)

Creative painting in various media with emphasis on a modern approach and handling of medium. Research and experience in contemporary trends: abstracts, non-objective, and abstract expressionism.

211-529. Painting II Credit 3(0-6)
(Formerly Art 3269)

Development of the student as a professional artist; advance research and familiarization with contemporary trends, concepts, forms, and symbols. Emphasis on an original contemporary statement.

Advanced Undergraduate and Graduate

211-600. Public School Art Credit 3(3-0)
(Formerly Art 3270)

Study of materials, methods, and procedures in teaching art in public schools. Special emphasis is placed on selection and organization of materials, seasonal projects, lesson plan.

211-602. Seminar in Art History Credit 3(3-0)
(Formerly Art 3273)

Investigation in depth of the background influences which condition stylistic changes in art forms by analyzing and interpreting works of representative personalities.

211-603. Studio Techniques Credit 3(3-0)
(Formerly Art 3273)

Demonstrations that illustrate and emphasize the technical potentials of varied media. These techniques are analyzed and discussed as a point of departure for individual expression.

211-604. Ceramic Workshop Credit 2(0-2)
(Formerly Art 3274)

Advanced studio problems and projects in ceramics with emphasis on independent creative work. The student is given opportunity for original research and is encouraged to work toward the development of a personal style in the perfection of technique.

211-605. Printmaking Credit 3(3-0)
(Formerly Art 3275)

Investigation of traditional and experimental methods in printmaking. Advanced studio problems in woodcut etching, lithography, and serigraphy.

211-606. Sculpture Credit 3(3-0)
(Formerly Art 3276)

Further study of sculpture with an expansion of techniques. Individual problems for advanced students.

211-607. Project Seminar Credit 2(0-4)
(Formerly Art 3277)

Advanced specialized studies in creative painting, design, and sculpture. By means of discussion and suggestions, this seminar intends to solve various problems which might arise in each work. Prerequisite: Consent of the instructor.

211-608. Arts and Crafts Credit 3(3-0)
(Formerly Art 3278)

Creative experimentation with a variety of materials, tools, and processes: projects in wood, metal, jewelry making, wood and metal construction, fabric design, leather craft, puppet making, and paper sculpture.

DEPARTMENT OF BIOLOGY
Arthur Hicks, Chairperson

Undergraduate

221-100. Biological Science Credit 4(3-2)**
(Formerly Biol. Sc. 1501)

This is a general education course that stresses the objectives presented under the general education program of the School of Education and General Studies. It is structured to meet the needs of students who plan to teach (a) at the pre-school level, (b) at the elementary school level, (c) at the secondary level in a non-science mathematics areas, and (d) in the area of music. In addition this course is designed for freshmen who plan to concentrate in the divisions of the Humanities or the Social Sciences.

221-400. Field Biology Credit 3(1-4)
(Formerly Biol. 1540)

This course is designed to give a more detailed understanding of the ecological requirements of organisms, their distribution and their way of life. Emphasis is placed on the method of collecting, classification, and preserving samples of organisms, where and when to find them and the sources of pertinent information regarding them.

BACTERIOLOGY

Undergraduate

221-120. Microbiology Credit 4(2-4)
(Formerly Bact. 1523)

A survey of the principles and techniques of microbiology and immunology with special emphasis on their application to nursing.

221-121. General Microbiology Credit 4(2-4)
(Formerly Gen. Bact. 1524)

A general course designed to orient the student within the world of microscopic living things, including yeasts, molds, bacteria, rickettsiae, and viruses. Detailed study is given to bacteria as prototype of all microorganisms. Relationships among microorganisms and selected microorganisms (higher plants, animals, man) are emphasized. Prerequisites: Biology 160, 140; Chemistry 106-116 and 107-117.

**General Education course for majors.

221-420. Food Microbiology **Credit 4(2-4)**
(Formerly Bact. 1543; Dairy Bact. 420)

A general course which considers some of the common organisms associated with normal, and abnormal fermentations of milk; the role of microorganisms in the production and decomposition of various dairy products is also considered. Prerequisite: Biology 121.

221-421. Soil Bacteriology **Credit 4(2-4)**
(Formerly Bact. 1544)

The role of microorganisms in soil fertility. Special emphasis is on the activity of the nitrogen-fixing bacteria and also those concerned in the decomposition of organic waste materials. Prerequisite: Biology 121.

BOTANY

Undergraduate

221-140. General Botany **Credit 4(2-4)**
(Formerly Bot. 1507)

Plants as living organisms constitute an integral part of man's environment. Emphasis is placed on cellular function, plant structure and function, evolutionary tendencies, and living processes.

221-430. Plant Taxonomy **Credit 4(2-4)**
(Formerly Bot. 1527)

Systematic botany, and taxonomic system, botanical nomenclature, and herbarium techniques are combined in this study of selected orders, families, and genera of seed plants. Prerequisite: Botany 140.

221-432. Plant Physiology **Credit 4(2-4)**
(Formerly Bot. 1528)

An elementary course designed to develop a clear understanding of the basic physiological process related to the structure, growth, and function of the seed plants. Prerequisite: Biology 140, Chemistry 106 and 107.

221-530. Plant Pathology **Credit 4(2-4)**
(Formerly Bot. 1547)

Basic factors governing the development of plant diseases including host-parasite relationships, effect of environment on disease development and the nature of disease resistance. Prerequisite: Botany 140.

Advanced Undergraduate and Graduate

221-640. Plant Biology **Credit 3(2-2)**
(Formerly Bot. 1572)

A presentation of fundamental botanical concepts to broaden the background of high school biology teachers. Bacteria, fungi, and other microscopic plants will be considered as well as certain forms of plants. The course will consist of lectures, laboratory projects, and field trips.

221-642. Special Problems in Botany **Credit 3(2-2)**
(Formerly Bot. 1573)

Open to advanced students in botany for investigation of specific problems. Prerequisite: Biology 140 or 640.

GENERAL SCIENCE

221-600. General Science for **Credit 3(3-0)**
Elementary Teachers
(Formerly Gen Sci. 1570)

This course will consider some of the fundamental principles of the life and physical sciences in an integrated manner in the light of present society needs.

ZOOLOGY

Undergraduate

221-160. General Zoology **Credit 4(2-4)**
(Formerly Zool. 1512)

An introduction to the study of invertebrates and vertebrates with emphasis on cellular physiology and the morphology, and physiology of representative forms.

221-260. Comparative Evolution of the **Credit 4(2-4)**
Vertebrates
(Formerly Zool. 1531)

A comparative study of chordate organ systems with rather detailed emphasis on the evolution and organogenesis of primitive chordates, dogfish shark and the cat. Prerequisite: Biology 160.

221-261. Sociobiology **Credit 3(3-0)**

An introductory interdisciplinary course training with the social behavior with special emphasis on the formation, maintenance, and disruption of social bonds. Prerequisite: An introductory course in Animal Biology.

221-460. Advanced Invertebrate Zoology **Credit 4(2-4)**
(Formerly Zool. 1532)

Comprehensive consideration of the morphology, function, phylogeny, classification and the life histories of representative forms of lower and higher invertebrate groups exclusive of insects. Prerequisite: Biology 160.

221-461. Human Anatomy and Physiology **Credit 4(2-4)**
(Formerly Zool. 1533)

A study of general structure and function of the human body. Not open to Biology majors.

221-465. Histology **Credit 4(2-4)**
(Formerly Zool. 1551)

The microscopic anatomy of cells, tissues and organs with special emphasis on histogenesis, histochemistry and histophysiology. Prerequisite: Biology 160.

221-466. Principles of Genetics **Credit 3(2-2)**
(Formerly Zool. 1552)

Chromosomal mechanisms and the molecular basis of heredity; concept of template surfaces and the replication and genetic organization of DNA. Gene action at the molecular level; gene structure and function; the genetic code; regulation of protein synthesis; cell differentiation and development. Prerequisite: Biology 160.

221-467. General Entomology **Credit 3(1-4)**
(Formerly Zool 1553)

Elementary structure, description, and habits of the principal orders of insects. Laboratory work will consist of collecting, mounting, preserving, and classification of principal insect representatives. Recommended for general science and biological science majors. Prerequisites: Biology 160.

221-468. Economic Entomology Credit 3(2-2)
(Formerly Zool. 1554)

Elementary structure, life histories, classification, and control of insect pests and related arthropods. Recommended for students majoring in one of the agricultural sciences. Prerequisite: Biology 160.

221-469. Human Anatomy Credit 3(2-2)
(Formerly Zool. 1556)

Lectures, demonstrations and laboratory study emphasizing basic facts and principles of body structure. Not open to Biology majors.

221-560. Human Physiology Credit 3(2-3)
(Formerly Zool. 1565)

An introductory course with emphasis placed on basic principles and mechanisms of physiological functioning of body cells, tissues and systems. Required of majors in Physical Education. Not open to Biology majors. Prerequisite: Biology 469.

221-561. Vertebrate Embryology Credit 4(2-4)
(Formerly Zool. 1566)

Study of the developmental stages of selected vertebrates. The materials are treated comparatively and consist of amphibian, bird, rodent, and references to other mammalian forms. Prerequisite: Biology 260.

221-562. Introductory Cell Physiology Credit 4(2-4)
(Formerly Zool. 1567)

A treatment at the molecular level of the fundamental processes in living cells. The biochemistry of cellular constituents, bioenergetics, intermediary metabolism, and the regulatory mechanisms of the cell will be discussed. Prerequisite: Chemistry 221.

221-568. Seminar in Biology Credit 1(1-0)
(Formerly Zool. 1568)

A seminar on selected topics and recent advances in the field of plant and animal biology. This course is required of all seniors.

221-569. Seminar in Biology Credit 1(1-0)
(Formerly Zool. 1569)

A continuation of Zoology 568.

Advanced Undergraduate and Graduate

221-660. Special Problems in Zoology Credit 3(2-2)
(Formerly Zool. 1574)

Open to students qualified to do research in Zoology.

221-661. Mammalian Biology Credit 3(3-0)
(Formerly Zool. 1575)

Study of the evolutionary history, classification, adaptation and variation of representative mammals. Prerequisite: Biology 160.

221-662. Biology of Sex Credit 3(3-0)
(Formerly Zool. 1576)

Lectures on the origin and development of the germ cells and reproductive systems in selected animal forms. Prerequisites: Biology 140, 160, and 260.

221-663. Cytology Credit 3(3-0)
(Formerly Zool. 1577)

Study of the cell with lectures and periodic student reports on modern advances in cellular biology. Prerequisites: Biology 140, 160, and 260.

221-664. Histo-Chemical Technique Credit 3(1-4)
(Formerly Zool. 1579)

Designed to develop skills in the preparation of cells, tissues and organs for microscopic observation and study. Prerequisites: Biology 160 and 260.

221-665. Nature Study Credit 3(3-0)
(Formerly Zool. 1579)

A study of diversified organisms, their habits, life histories, defenses, sex relationships, periodic activities and economic values designed to acquaint the student with fundamental knowledge that should lead to fuller appreciation of nature.

221-666. Experimental Embryology Credit 3(1-4)
(Formerly Zool. 1580)

A comprehensive lecture-seminar course covering the more recent literature on experimental embryology and development physiology. Experimental studies treating with fish, amphibian, chick and rodent development are designed as laboratory projects. Prerequisite: Biology 561 or equivalent.

221-667. Animal Biology Credit 3(2-2)
(Formerly Zool. 1581)

A lecture-laboratory course stressing fundamental concepts and principles of biology with the aim of strengthening the background of high school teachers. Emphasis is placed on the principles of animal origin structure, function, development, and ecological relationships.

221-668. Animal Behavior Credit 3(3-0)

A study of the qualitative and quantitative difference between behavioral characteristics at different evolutionary levels, adaptiveness of differences in behavior and the development of behavior will be emphasized. Prerequisites: Biology 260, 466 and 561.

221-669. Recent Advances in Cell Biology Credit 3(3-0)

A course designed to meet the needs of advanced undergraduate and graduate students desirous of the more recent trends concerning functions of organized cellular and sub-cellular systems. Current research as it relates to the molecular and fine structure basis of cell function, replication, and differentiation will be discussed. Prerequisites: Biology 466, 562, credit or concurrent registration in Chemistry 224.

DEPARTMENT OF CHEMISTRY
Walter G. Wright, Chairperson

223-099. Introductory Chemistry Credit 3(3-0)

Basic methods and concepts in chemistry with emphasis on solving chemistry problems. Recommended first course in chemistry for students having little or no background in high school chemistry. May be used as preparation for Chemistry 101, 104, or 106.

*Students are required to purchase supplemental materials for this course.

†General Education course.

223-100. Physical Science†* **Credit 3(3-0)**
(Formerly Phy. Sc. 1601)

A one semester introductory course designed to make clear the nature of science as an enterprise and illustrate by numerous examples how science really proceeds. Learning experiences are constructed so that they closely approximate real life situations where one has to search for clues and insights from a variety of sources. This course is not open to students who have received credit for Chemistry 10, 102, 104, 105, 106, or 107.

223-101. General Chemistry I†* **Credit 3(3-0)**
(Formerly Chem. 1611)

Introduction to the study of chemistry, atomic structure and periodicity, chemical bonding, states of matter and phase transitions, solutions, and electrolytes. This course is designed for majors in engineering and other sciences. Chemistry majors may register for this course with departmental approval. Prerequisites: 2 units of high school algebra or equivalent and 1 unit of high school chemistry or Chemistry 099.

223-102. General Chemistry II†* **Credit 3(3-0)**
(Formerly Chem. 1612)

A continuation of general chemistry including an introduction to qualitative inorganic analysis. Prerequisite: Chemistry 101.

223-104. General Chemistry IV†* **Credit 3(3-0)**
(Formerly Chem. 1615)

Introduction to fundamental techniques and concepts in chemistry, including writing and interpretation of symbols, formulas, equations, atomic structure, composition and reactions of inorganic compounds. This course is not open to majors in chemistry, physics, biology, mathematics and engineering.

223-105. General Chemistry V†* **Credit 3(3-0)**
(Formerly Chem. 1616)

A study of organic chemistry and the chemical changes which take place during life processes. Prerequisite: Chemistry 104 or equivalent.

223-106. General Chemistry VI†* **Credit 3(3-0)**
(Formerly Chem. 1618)

A course which emphasizes basic principles and important theoretical concepts of chemistry. Topics will include atomic structure, electronic configuration, the wave mechanical model of the atom, chemical bonding, states of matter, chemical equilibria, systems of acids and bases, and electrochemistry. Prerequisites: 2 units of high school algebra or equivalent and 1 unit of high school chemistry or Chemistry 099.

223-107. General Chemistry VII†* **Credit 3(3-0)**
(Formerly Chem. 1619)

A continuation of Chemistry 106. Includes chemistry of important metals and nonmetals and a rigorous treatment of qualitative inorganic analysis.

223-108. Chemistry Orientation **Credit 1(1-0)**
(Formerly Chem. 1617)

A series of lectures and discussions on the nature and requirements of the chemical profession; the application of chemistry to modern living, and other selected topics.

223-110. Physical Science Laboratory **Credit 1(0-2)**

A laboratory course designed to bring students into working contact with the essential aspects of scientific experiences. It is in this course that the student develops concrete ideas about the operational meaning of the scientific method and problem solving. Corequisite: Physical Science 100. This course is not open to students who have received credit for Chemistry 111, 112, 114, 115, 116, or 117.

223-111. General Chemistry Laboratory†* **Credit 1(0-3)**

An introduction to quantitative studies of substances and chemical reactions. Emphasis is also placed on the development of manipulative skills. Corequisite: Chemistry 101.

223-112. General Chemistry II Laboratory†* **Credit 1(0-3)**

Continuation of Chemistry 111 with an introduction to qualitative analysis. Corequisite: Chemistry 102. Prerequisite: Chemistry 111.

223-114. General Chemistry IV Laboratory†* **Credit 1(0-3)**

A study of inorganic reaction and substances and their relation to the processes. Corequisite: Chemistry 104.

223-115. General Chemistry V Laboratory†* **Credit 1(0-3)**

A study of organic reactions and substances and their relation to life processes. Corequisite: Chemistry 105. Prerequisite: Chemistry 114.

223-116. General Chemistry VI Laboratory†* **Credit 2(0-4)**

A course which emphasizes quantitative studies of chemical reactions such as acid-base studies, redox reactions, and equilibrium reactions. Emphasis is also placed on the development of manipulative skills in the laboratory. Corequisite: Chemistry 106.

223-117. General Chemistry VII Laboratory†* **Credit 2(0-4)**

A continuation of Chemistry 116 with an introduction to qualitative analysis. Corequisite: Chemistry 107. Prerequisite: Chemistry 116.

223-210. Cooperative Experience I **Credit 2(2-0)**

A supervised learning experience in a specified private or governmental chemical facility. The student's performance will be evaluated by reports from the supervisor of the experience and the departmental staff. The student must present a seminar regarding the experience upon return to the University.

223-221. Organic Chemistry I†* **Credit 3(3-0)**

A study of the hydrocarbons (aliphatic and aromatic) and introduction to their derivatives. Prerequisite: Chemistry 102, 105, or 107.

223-222. Organic Chemistry II†* **Credit 3(3-0)**
(Formerly Chem. 1622)

Continuation of the study of derivatives of hydrocarbons and more complex compounds. Prerequisite: Chemistry 221.

223-223. Organic Chemistry I Laboratory* **Credit 2(0-4)**

This laboratory course emphasizes the study of physical and chemical properties of aliphatic and aromatic compounds. Modern instrumentation such as gas and column chromatography, infrared and ultraviolet analyses are used. Corequisite: Chemistry 221.

223-224. Organic Chemistry II Laboratory* **Credit 2(0-6)**

A continuation of Chemistry 223. However, more emphasis is placed on syntheses and qualitative analysis of organic compounds. Corequisite: Chemistry 222. Prerequisite: Chemistry 223.

223-231. Quantitative Analysis I (Formerly Chem. 331) **Credit 3(3-0)**

Titrimetric and gravimetric analyses including theory and calculations associated with acid-base equilibria, oxidation reduction, nucleation, and precipitation-complexation processes. Corequisite: Mathematics 131. Prerequisite: Chemistry 102 or 107.

223-232. Quantitative Analysis I Laboratory* **Credit 2(0-4)**

This laboratory course emphasizes the basic principles of chemical separations. Laboratory studies of gravimetric and titrimetric analyses are also encountered. Corequisite: Chemistry 231. Prerequisite: Chemistry 117.

223-251. Elementary Biochemistry (Formerly Chem. 1624) **Credit 2(2-0)**

A study of fundamental cellular constituents. Emphasis is placed on physiological applications and analyses. Prerequisites: Chemistry 105 or 222. This course is open to non-chemistry majors only.

223-252. Elementary Biochemistry Laboratory* **Credit 1(0-3)**

Elementary biochemical reactions are studied with emphasis placed on applications to biology, home economics and nursing. Prerequisite: Chemistry 115 or 224. Corequisite: Chemistry 251.

223-301. Current Trends in Chemistry (Formerly Chem. 1641) **Credit 2(2-0)**

A series of lectures and discussions on special problems in chemistry and of the chemical profession not covered in formal courses.

223-310. Cooperative Experience II **Credit 3(3-0)**

A supervised learning experience in a specified private or governmental chemical facility. The student's performance will be evaluated by reports from the supervisor of the experience and the departmental staff. The student must present a seminar regarding the experience upon return to the University.

223-431. Quantitative Analysis II (Formerly Chem. 1662) **Credit 2(2-0)**

A study of the theory and the operational features of some of the more important instruments that are currently being used as analytical tools such as ultraviolet, visible-light, and infrared spectrophotometers, electro-analytical instruments, thermometric titrators, fluorimeters, etc. Prerequisite: Chemistry 441. Corequisite: Chemistry 442/444.

223-432. Quantitative Analysis II Lab. **Credit 2(0-4)**

This laboratory course features the utilization of modern instruments such as ultraviolet, visible and infrared, and atomic absorption spectrophotometers, chromatographs (gas-liquid and liquid), electroanalyzer, and electrophoretic analyzer. Corequisite: Chemistry 431.

223-441. Physical Chemistry I (Formerly Chem. 1663) **Credit 3(3-0)**

A study of the fundamental laws governing matter in the gaseous state, and the laws of thermodynamics and their applications to chemistry; includes an introduction to statistical thermodynamics. Prerequisite: Math. 117, Physics 222, and Chemistry 231.

223-442. Physical Chemistry II (formerly Chem. 1664) **Credit 3(3-0)**

A continuation of Chemistry 441. Studies of solid and liquid states, solutions, phase equilibria, chemical kinetics, and electrochemistry. Prerequisite: Chemistry 441.

223-443. Physical Chemistry I Laboratory* **Credit 1(0-3)**

Thermodynamic and kinetic studies are emphasized in this course. Corequisite: Chemistry 441.

223-444. Physical Chemistry II Laboratory* **Credit 1(0-3)**

A continuation of Chemistry 443. Corequisite: Chemistry 442

223-503. Chemical Research (Formerly Chem. 403) **Credit 4(0-10)**

Makes use of the laboratory and library facilities in studying minor problems of research. Prerequisite: Advanced standing and permission of the Department.

223-504. Independent Study (Formerly Chem. 404) **Credit 4(0-10)**

Independent study or research in a particular area of chemistry. Prerequisite: Permission of the department and advanced standing.

223-511. Inorganic Chemistry **Credit 3(3-0)**

Introductory survey of structure and bonding in inorganic compounds; coordination compounds of the transition metals donor-acceptor interactions; bonding theories. Prerequisite: Chem. 441; Corequisite: Chem. 442.

223-545. Physical Chemistry III (Formerly 502) **Credit 3(3-0)**

A study of quantum chemistry and its application to studies of atomic and molecular structure. Prerequisite: Chemistry 442.

Advanced Undergraduate and Graduate

223-610. Inorganic Synthesis (Formerly Chem. 1670) **Credit 2(1-3)**

Discussion of theoretical principles of synthesis and development of manipulative skills in the synthesis of inorganic substances. Prerequisites: One year of organic chemistry; one semester of quantitative analysis.

223-611. Advanced Inorganic Chemistry (Formerly Chem. 1671) **Credit 4(4-0)**

A course in the theoretical approach to the systematization of inorganic chemistry. Prerequisite: Chemistry 442.

*Students are required to purchase supplemental materials for this course.

23-621. Intermediate Organic Chemistry Credit 3(3-0)
(Formerly Chem. 501)

An in depth examination of various organic mechanisms, reactions, structures, and kinetics. Prerequisite: Chemistry 222 and Chemistry 442.

23-624. Qualitative Organic Chemistry* Credit 5(3-6)
(Formerly 1776)

A course in the systematic identification of organic compounds. Prerequisite: One year of Organic Chemistry.

23-631. Electroanalytical Chemistry Credit 3(3-0)
(Formerly Chem. 1781)

A study of the theory and practice of polarography, chronopotentiometry, potential sweep chronoamperometry and electrodeposition. The theory of diffusion and electrode kinetics will also be discussed along with the factors which influence rate processes, the double layer, adsorption and catalytic reactions. Prerequisite: Chemistry 431 or equivalent.

23-641. Radiochemistry Credit 3(3-0)
(Formerly Chem. 1782)

A study of the fundamental concepts, processes, and applications of nuclear chemistry, including natural and artificial radioactivity, sources, and chemistry of the radioelements. Open to advanced majors and others with sufficient background in chemistry and physics. Prerequisites: Chemistry 442 or Physics 406.

23-642. Radioisotope Techniques and Applications Credit 2(1-3)
(Formerly Chem. 1783)

The techniques of measuring and handling radioisotopes and their use in chemistry, biology, and other fields. Open to majors and non-majors. Prerequisite: Chemistry 102 or 105 or 07.

23-643. Introduction to Quantum Mechanics Credit 4(4-0)
(Formerly Chem. 1784)

Non-relativistic wave mechanics and its application to simple systems by means of the operator formulation. Prerequisite: Chemistry 442 and Physics 222. Corequisite: Mathematics 300.

23-651. General Biochemistry Credit 5(3-6)
(Formerly Chem. 1780)

A study of modern biochemistry. The course emphasizes chemical kinetics and energetics associated with biological reactions and includes a study of carbohydrates, lipids, proteins, vitamins, nucleic acids, hormones, photosynthesis, and respiration. Prerequisite: Chemistry 431 and 442.

DEPARTMENT OF ENGLISH
Jimmy L. Williams, Chairperson
Office: 202 Crosby Hall

GENERAL EDUCATION

212-099. Basic Reading and Writing Skills Credit 4(3-3)

The course covers the six basic reading skills: word recognition, meaning, study skills, flexibility, appreciation, and interests; mastery of sentence structure, rudiments of grammar, mechanics and vocabulary study. Offered Fall, Spring, and Summer.

212-100. Ideas and Their Expression I* Credit 3(3-0)
(Formerly English 2401)

An introduction to oral and written communications; provides the student with experience in writing short compositions, outlining written materials, improving reading, speaking skills. Offered Fall, Spring and Summer.

212-101. Ideas and Their Expression II* Credit 3(3-0)
(Formerly English 2402)

A continuation of English 100 which provides the student with additional experience in expository writing, with intensive instruction in descriptive, argumentative writing, narrative composition; introduces student to the techniques of investigative writing and to the skills of reading different literary genres; provides opportunities for additional experience in oral expression. Prerequisite: English 100. (Offered Fall, Spring and Summer.

212-102. Developmental Reading Credit 2(2-0)
(Formerly English 2403)

Instruction and practice in methods of increasing rate of reading and techniques of comprehending written material; emphasis upon vocabulary study skills. Limited registration. Offered Fall and Spring.

212-205. Topics in Literature Credit 3(3-0)

Study of selected topics in literature. Elective course primarily for non-English majors. Prerequisite: English 101. Offered upon sufficient demand.

HUMANITIES

212-200. Survey of Humanities I* Credit 3(3-0)

A study of interrelationships of literature, music, and the fine arts; a study of master works, philosophical ideas, and artistic movements of Western Civilization, with attention given also to non-Western culture. Will survey cultures from ancient times to the end of the Renaissance. Prerequisite: English 101. Offered Fall, Spring and Summer.

212-201. Survey of Humanities II* Credit 3(3-0)

A continuation of English 200. Will begin with the Baroque period and will include Neo-Classicism. Romanticism, and modern modes of artistic expression. Prerequisites: English 101 and Humanities 200. Offered Fall, Spring and Summer.

212-202. The Humanities in America Credit 3(3-0)

A survey of the interrelationship of American and Afro-American literature, music, and art from colonial times to the present. The course will also include a study of the American historical, social, and philosophical experience. Prerequisite: English 101. Offered in Fall.

212-203. Humanities Perspectives of the South Credit 3(3-0)

A course to examine the South from the perspectives of its history, beliefs, literature, music, and art. Prerequisite: English 101. Offered Fall and Spring.

212-204. Topics in Humanities: A Multidisciplinary Course Credit 3(3-0)

Study of selected topics in literature, art, music, philosophy, and other branches of the humanities. Elective course primarily for non-English majors. Prerequisite: English 101. Offered upon sufficient demand.

212-420. Humanities III, Great Ideas of World Civilization Credit 3(3-0)

A seminar devoted to the identification, analysis, and appreciation of some of the basic ideas or conceptions which have underlain world culture in the arts, religion, philosophy, and social attitudes from ancient times to the present. Offered upon sufficient demand.

LANGUAGE AND COMPOSITION

212-260. Expository Writing I Credit 3(3-0)

An intensive study of the basic expository modes of narration, definition, comparison/contrast, process, etc., with a special emphasis on their adaptation to professional writing in non-technical areas. Prerequisite: English 101. Offered in Fall.

212-261. Expository Writing II Credit 3(3-0)

A continuation of Expository Writing I with a special emphasis on the style, organization, and conventions appropriate to the professions. Prerequisite: English 260. Offered in Spring.

212-300. Advanced Composition* Credit 3(3-0)

A study of techniques of narrative, descriptive, expository, and argumentative composition. Prerequisite: English 101. Offered Fall, Spring and Summer.

212-305. Grammar, Literature and Composition for Pre-Professional Students Credit 3(3-0)

A course to refine the skills in grammar, literature, and composition that are particularly needed by pre-professional students. Recommended for students preparing for the GRE, LSAT, and NTE. Prerequisites: English 101. Offered in Spring.

212-310. Introductory Linguistics Credit 3(3-0)

An introduction survey covering the nature of language; the various levels of linguistic analysis (phonology, morphology, syntax, and semantics); dialectology (regional and social); and comparative historical linguistics. Strongly recommended as preparation for English 450 & 501. Prerequisite: English 101. Offered in Fall.

212-331. Writing for Science and Technology (Formerly English 460) Credit 3(3-0)

Study and practice of the basic techniques of writing and editing scientific and technical materials for both the general audience and the specialists. Prerequisite: Junior standing. Offered Fall, Spring and Summer.

212-450. Advanced English Grammar (Formerly English 2441) Credit 3(3-0)

An intensive study of the structure of the English language with tolerance towards language dialects and levels as effective communication; emphasis placed upon a knowledge of grammar essential to teaching in the junior and senior high school. Prerequisite: English 101. Offered in Fall.

212-480. Editing Credit 3(3-0)

A course designed to teach the general techniques of editing. Methods of checking completeness, integrity, clarification, style, and recognizing the need for substantial changes are included. Prerequisite: English 305. Offered upon sufficient demand.

212-490. Professional Writing Internship Credit 6(1-10)

On-the-job training with an appropriate agency; compilation of a portfolio of high caliber. Prerequisites: English 261 & 480. Offered upon sufficient demand.

212-501. Introduction to the History of the English Language (Formerly English 2462) Credit 3(3-0)

A course designed to develop the student's understanding of modern English syntax, vocabulary, etymology, spelling, pronunciation and usage. Offered in Spring.

JOURNALISM

212-470. Media Internship (Formerly English 639) Credit 6(1-10)

On-the-job training with local news gathering organizations and a critical analysis of a contemporary communications problem. Prerequisites: English 225, 230, and either 231 or 331. Offered in Spring and Summer.

LITERATURE

212-210. Introduction to Literary Studies (Formerly English 2463) Credit 3(3-0)

Required of English majors and minors in the sophomore year, open to others only with approval of instructor; the critical analysis, literary criticism, investigative and bibliographical techniques necessary to advanced study in English. This course is a prerequisite for all advanced courses in literature. Prerequisite: English 100. Offered Fall and Spring.

212-220. English Literature I (Formerly English 2437) Credit 3(3-0)

A survey of the literary movements and major authors of English literature in relation to the cultural history of England from Beowulf to 1798. Prerequisite: English 101. History 100. Offered in Fall.

212-221. English Literature II (Formerly English 2438) Credit 3(3-0)

A continuation of English 220 from 1798 - Present. Prerequisite: English 100, 101. Offered in Spring.

212-400. Survey of Dramatic Literature I (Formerly English 2450) Credit 3(3-0)

A survey course in the history, literature, criticism, and art of the theatre to the nineteenth century. Prerequisite: English 210. Offered upon sufficient demand.

212-401. Survey of Dramatic Literature II (Formerly English 2451) Credit 3(3-0)

A continuation of English 400, from the nineteenth century to the present. Prerequisite: English 210. Offered in Spring.

212-410. Shakespeare (Formerly English 2452) Credit 3(3-0)

An introduction to a study of the works of William Shakespeare through a detailed examination of representative works selected from the major periods of his development as a dramatist. Prerequisite: English 210. Offered in Spring.

*Students are required to purchase supplemental materials for this course.

212-425. World Literature Credit 3(3-0)

A survey of selected major world writers from ancient times to the present. Offered in Fall.

212-430. American Literature I Credit 3(3-0)
(Formerly English 2455)

A study of the literary movements and major authors of American literature in relation to the cultural history of America from the Colonial Period to 1865. Prerequisites: English 210, Humanities 200-201. Offered in Fall.

212-431. American Literature II Credit 3(3-0)
(Formerly English 2456)

A continuation of English 430, from 1865- Present. Prerequisite: English 210, Humanities 200-201. Offered in Spring.

212-433. Survey of Afro-American Literature Credit 3(3-0)
(Formerly English 629)

The study of prose, poetry, and drama by American authors of African ancestry. Their works will be studied in relation to the cultural and literary traditions of their times. Dunbar, Chesnutt, Johnson, Cullen, Bontemps, Hughes, Wright, Ellison, Baldwin, and Yerby will be included. Prerequisite: English 101, Humanities 200-201. Offered upon sufficient demand.

212-435. The Novel Credit 3(3-0)
(Formerly English 2457)

A study of the novel as an art form, with attention to significant English novelists from 1750 to the present. Prerequisite: English 210. Offered in Fall.

212-436. Modern Poetry Credit 3(3-0)
(Formerly English 2458)

A study of poetry as an art form, with attention to significant English and American poets of the twentieth century. Prerequisite: English 210. Offered in Spring.

212-445. Independent Study in English Credit 3(3-0)

Provides an opportunity for students to pursue independently in-depth study in literature, linguistics, or professional writing. Prerequisite: Second semester junior or senior standing, and prior consultation with department faculty. Offered Fall, Spring and Summer.

212-475. British and American Literary History Credit 3(3-0)

A course designed to provide the student with the opportunity to develop a sense of the continuity of British and American literary history, supported by a reading of major works. Prerequisite: Senior standing. Offered upon sufficient demand.

212-500. Literary Research and Criticism Credit 3(3-0)

Open only to junior and senior English majors and minors. Advanced study in the tools and techniques of literary research and critical analysis, emphasizes independent study, a study of the major schools of criticism, and culminates in the completion of a study of a problem in literature. Offered in Spring.

Advanced Undergraduate and Graduate

212-600. Language Variations in American English Credit 3(3-0)

A survey of regional and social dialects in the United States and a study of their interrelationship; an example of some of the motivations for dialectical divergences, especially in the instance of non-standard dialects; and a consideration of functional varieties and social dialect shifting. Prerequisites: English 310 or graduate standing. Offered upon sufficient demand.

212-603. Introduction to Folklore Credit 3(3-0)
(Formerly English 2498)

Basic introduction to the study and appreciation of folklore. (Cross listed as Anthropology 603.) Offered in Spring/alternate years.

212-620. Elizabethan Drama Credit 3(3-0)
(Formerly English 2741)

Chief Elizabethan plays, tracing the development of dramatic forms from early works to the close of the theaters in 1642. Prerequisite: English 210, 220-221. Offered in Spring/alternate years.

212-626. Children's Literature Credit 3(3-0)
(Formerly English 2476)

A study of the types of literature designed especially for students in the upper levels of elementary school and in junior high school. (Not accepted for credit toward graduate concentration in English.) Prerequisite: English 101, Humanities 200-201. Offered in Fall, and Summer.

ENGLISH

Advanced Undergraduate and Graduate

212-627. Literature for Adolescents Credit 3(3-0)

A course to acquaint prospective and in-service teachers with a wide variety of good literature that is of interest to adolescents. Emphasis on thematic approach to the study of literature, bibliotherapy, continental writers, book selection, and motivating students to read widely and independently with depth and understanding. Prerequisite: English 101, 200, and 201 or graduate standing. Offered in Spring.

212-628. The American Novel Credit 3(3-0)
(Formerly English 2478)

A history of the American novel from Cooper to Faulkner, Melville, Twain, Howells, James, Dreiser, Lewis, Hawthorne, Faulkner, and Hemingway will be included. Prerequisite: English 210. Offered upon sufficient demand.

212-650. Afro-American Folklore Credit 3(3-0)

A study of folk tales, ballads, riddles, proverbs, superstitions and folk songs of black Americans. Parallels will be drawn between folklore peculiar to black Americans and that of Africa, the Caribbean, and other nationalities. Offered in Spring.

212-652. Afro-American Drama Credit 3(3-0)

A detailed study of the dramatic theory and practice of black American writers against the backdrop of Continental and American trends. Special attention will be given to the works of major figures from the Harlem Renaissance to the present. Works by Bontemps, Cullen, Hughes, Hansberry, Ward, Davis, Baldwin, Baraka (Jones), Gardone, and Bullins will be included. Offered upon sufficient demand.

212-654. Afro-American Novel I **Credit 3(3-0)**

An intensive bibliographical, critical, and interpretative study of novels by major black writers through 1940. Novelists emphasized include Dunbar, Chesnutt, Toomer, McKay, Larsen, Hurston, Griggs, Fauset, and Wright. Offered in Fall/alternate years.

212-656. Afro-American Novel II **Credit 3(3-0)**

An intensive bibliographical, critical, and interpretative study of novels by major black writers after 1940. Novelists emphasized include Wright, Ellison, Baldwin, Himes, Demby, Williams, Walker, Brooks, Petry, Gaines, and Mayfield. Offered in Fall/alternate years.

212-658. Afro-American Poetry I **Credit 3(3-0)**

An intensive study of Afro-American poetry from its beginning to 1940 with special attention given to poets of the Harlem Renaissance. Poets to be studied include Terry, Hammon, Wheatley, A.A. Whitman, Horton, Braithwaite, J.W. Johnson, Horne, Fenton Johnson, George Douglas Johnston, McKay, Cullen, Cuney, and Hughes. Offered in Summer/alternate years.

212-660. Afro-American Poetry II **Credit 3(3-0)**

An intensive study of Afro-American poetry from 1940 to the present with consideration attention given to the revolutionary poets of the sixties and seventies. Poets to be studied include Hughes, Walker, F.M. Davies, Brooks, Brown, Hayden, Tolson, Lee, Reed, Giovanni, Angelou, Jeffers, Sanchez, Redmond, Fabio, Fields, and Jones. Offered in Fall.

212-662. History of American Idea **Credit 3(3-0)**

A study of major ideas which have animated American thought from the beginning to the present. Offered upon sufficient demand.

212-672. Independent Study in English **Credit 3(3-0)**

Provides an opportunity for students to pursue independently in-depth study in literature, linguistics, or professional writing. Work done in literature in this course may serve as groundwork for students pursuing the thesis option. Prerequisites: Second semester junior, senior, or graduate standing, and prior consultation with department faculty. Offered Fall, Spring and Summer.

DEPARTMENT OF FOREIGN LANGUAGES

Helen G. LeBlanc Disher, Chairperson
Office: 302 Crosby Hall

FRENCH*Undergraduate***217-100. Elementary French I*** **Credit 3(3-0)**
(Formerly French 101, 102, 2500)

A course for beginners which emphasizes the four language skills—listening, speaking, reading, writing. Prerequisite: None. Offered in Fall and Spring.

217-101. Elementary French II* **Credit 3(3-0)**
(Formerly French 102, 103, 2501)

A continuation of French 100 with further emphasis placed on the oral-aural approach. Prerequisite: French 100, or equivalent. Offered in Fall and Spring.

217-300. Intermediate French I* **Credit 3(3-0)**
(Formerly French 201, 2520)

A course which consists of a brief review of pronunciation. Grammar is stressed with emphasis on easy cultural reading. Prerequisites: French 100 and 101, or two units of high school French. Offered in Fall.

217-301. Intermediate French II* **Credit 3(3-0)**
(Formerly French 202, 2521)

This course is a continuation of French 300. Stress is placed on grammar, cultural reading and conversation. Prerequisite: French 300, or equivalent. Offered in Spring.

217-400. Phonetics **Credit 3(3-0)**
(Formerly French 203, 2522)

A course in French sounds and diction. Required of all students majoring and minoring in French. Recommended for those who wish to improve pronunciation. Prerequisite: French 300 and 301. Offered in Fall or Spring.

217-402. French for Reading Comprehension **Credit 3(3-0)**

Development of skills needed for reading competency and interpretation; preparation for French reading proficiency examinations; emphasis placed on vocabulary development; mastery of all aspects of noun/pronoun character and modifiers; knowledge of tense, mood and form of verb structure; reading comprehension analysis and evaluation of selected passages. Readings will be in areas as the humanities, mathematics, social and natural sciences. Prerequisite: Successful completion of Foreign Language requirements in major area or consent of instructor. Offered in Fall or Spring and by demand.

217-410. Intermediate Oral French **Credit 3(3-0)**
(Formerly French 204, 2523)

Intermediate oral French course which prepares students for French 411. It is designed to enable students to understand lectures and conversations of average tempo. Prerequisite: French 300 and 301. Offered in Fall or Spring.

217-411. Advanced Oral French **Credit 3(3-0)**
(Formerly French 205, 2524)

A course which offers to students intensive training in self-expression and an opportunity to improve pronunciation, diction, reading and speaking. Prerequisite: French 410. Offered in Fall or Spring.

217-415. Survey of French Literature I **Credit 3(3-0)**
(Formerly French 301, 2540)

A general introduction to the study of French literature. The course gives a clear idea of the great periods and main tendencies in the history of French thought and letters from 842 to the 18th century. Offered in Fall or Spring.

217-416. Survey of French Literature II **Credit 3(3-0)**
(Formerly French 301, 2541)

A continuation of French literature from the 18th century to the present. Offered in Fall or Spring.

217-417. Literature of Afro-French Expression **Credit 3(3-0)**

Introduction to the literary style and currents of thoughts, poetry and prose of selected Afro-French writers in the Caribbean; special attention to "Negritude" as reflected in major works of selected Afro-French and Francophone African authors. Prerequisite: French 301 or equivalent, or consent of instructor. Offered in Fall or Spring.

*Students are required to purchase supplemental materials for this course.

217-505. Advanced French Composition Credit 3(3-0)
(Formerly French 401, 2560)

Advanced course in oral and written self-expression in French. Special attention to vocabulary building, free composition and conversation, prepared and improvised, covering the many phases of everyday activities. Offered in Fall or Spring.

217-506. Advanced French Grammar and Composition Credit 3(3-0)
(Formerly French 402, 2561)

Course designed to give the students practical training in the use of advanced French grammar and reading. Offered in Fall or Spring.

217-508. French Civilization Credit 3(3-0)
(Formerly French 404, 2562)

A general survey of the history of France, with emphasis on the social, political and economic development designed to give the students an understanding of present conditions and events. A detailed study of such French institutions as art, music, and education. Course is also offered in conjunction with reports of collateral readings. Offered in Fall or Spring.

217-515. Structural Linguistic in the Teaching of French Credit 3(3-0)

A course which applies structural linguistic forms, doctrine and methodology to the teaching of French Historical development of the French language. Presentation of dialogues and drills in French. Emphasis on phonemics, morphology and syntax. Offered in Fall or Spring.

Advanced Undergraduate and Graduate

217-602. Problems and Trends in Foreign Languages Credit 3(3-0)
(Formerly French 501, 271)

Problems encountered by teachers given consideration. An update of developments in foreign language teaching and learning. Place and purpose of foreign languages in the curriculum today. Offered by demand.

217-603. Oral Course for Teachers of Foreign Languages Credit 3(3-0)
(Formerly French 502)

Designed for teachers of foreign languages to improve pronunciation. Offered by demand.

217-606. Research in the Teaching of Foreign Languages Credit 3(3-0)
(Formerly French 503, 2573)

Open to students who are interested in undertaking the study of a special problem in the teaching of a foreign language. Offered by demand.

217-607. French Literature of the Seventeenth Century Credit 3(3-0)
(Formerly French 302, 2574)

Course presents Classicism through masterpieces of Corneille, Racine, Moliere and other authors of the "Golden Period" in French letters. Offered by demand.

217-608. French Literature in the Eighteenth Century Credit 3(3-0)
(Formerly French 303, 2575)

To study in particular the life and works of Montesquieu, Voltaire, and Rousseau, and the Encyclopedists. Offered by demand.

217-609. French Literature of the Nineteenth Century Credit 3(3-0)
(Formerly French 304, 2576)

Study of the great literary currents of the Nineteenth Century Romanticism and Realism. Offered by demand.

217-610. The French Theatre Credit 3(3-0)
(Formerly French 504, 2577)

A thorough study of the French theatre from the Middle Ages to the present. Offered by demand.

217-612. The French Novel Credit 3(3-0)
(Formerly French 505, 2578)

A study of the novel from the Seventeenth Century to the present. Offered by demand.

217-614. French Syntax Credit 3(3-0)
(Formerly French 506, 2579)

Designed to teach grammar on the advanced level. Offered by demand.

217-616. Contemporary French Literature Credit 3(3-0)
(Formerly French 305 and 2542, 2580)

Course deals with the chief writers and literary currents from 1900 to the present. Offered by demand.

217-618. Selected Afro-French Poets Credit 3(3-0)

A study and analysis of the most representative works of Afro-French poets of South America, Africa and the Caribbean. Prerequisites: French 410, 411, 412 or consent of instructor. Offered by demand.

Graduate

217-720. Advanced Reading and Composition Credit 3(3-0)
(Formerly French 601 and 2580, 2585)

An advanced study of the content and stylistics of selected contemporary writings. Assigned topics for compositions and explications de textes. Offered by demand.

217-722. Romantic Movement in France Credit 3(3-0)
(Early Nineteenth Century)
(Formerly French 602 and 2581, 2586)

Background study of romanticism in works of Chateaubriand and Madame de Stael; emphasis placed on Lamartine, Hugo, Vigny and Musset; other writers and genres of the period will be studied. Offered by demand.

217-724. Seminar in Foreign Languages Credit 3(3-0)
(Formerly French 603 and 2582, 2587)

Readings and special topics in French. Presentations from students, faculty and guest lectures. Papers showing research techniques in literary study are required of all candidates for a degree with concentration in French. Offered by demand.

217-726. Contemporary Literary Criticism Credit 3(3-0)
(Formerly French 604 and 2583, 2587)

Methods and purposes of literary criticism and of French literary critics. Offered by demand.

217-728. Independent Study in Foreign Languages Credit 3(3-0)
(Formerly French 258, 2589)

Independent study and research in a special area of the foreign language. Offered by demand.

*Students are required to purchase supplemental materials for this course.

SPANISH

Undergraduate

217-104. Elementary Spanish I* Credit 3(3-0) (Formerly Spanish 101, 102, 2504)

A course for beginners which consists of grammar, composition, translation, practice in pronunciation and use of the spoken language. Offered in Fall and Spring.

217-105. Elementary Spanish II* Credit 3(3-0) (Formerly Spanish 102, 103, 2505)

Continuation of Elementary Spanish 104. Attention is given to advanced grammar. Prerequisite: Spanish 104 or equivalent. Offered in Fall or Spring.

217-320. Intermediate Spanish I* Credit 3(3-0) (Formerly Spanish 201, 2530)

Review of grammar, composition and conversation. Prerequisite: Spanish 105 or two units of high school Spanish. Offered in Fall.

217-321. Intermediate Spanish II* Credit 3(3-0) (Formerly Spanish 202, 2531)

Continuation of Spanish 320. Prerequisite: Spanish 320 or equivalent. Offered in Spring.

217-401. Spanish for Reading Comprehension Credit 3(3-0)

Development of skills needed for reading competency and interpretation; preparation for Spanish reading proficiency examination, emphasis placed on vocabulary development; mastery of all aspects of noun/pronoun character and modifiers; knowledge of tense, mood and form of verb structure; reading comprehension analysis and evaluation of selected passages. Readings will be in such areas as the humanities, the sciences, social and natural sciences and other areas of students' interests. Prerequisite: Spanish 321. Offered in Fall or Spring and by demand.

217-440. Phonetics Credit 3(3-0) (Formerly Spanish 202, 2532)

A systematic analysis of speech sounds, and the operation of phonetic laws. Prerequisite: Spanish 105 or equivalent. Offered by demand.

217-441. Intermediate Conversation Credit 3(3-0) (Formerly Spanish 204, 2533)

Practice and drill in oral Spanish based principally on topics of current interest. Prerequisite: Spanish 105 or equivalent. Offered by demand.

217-422. Introduction to Spanish Literature Credit 3(3-0) (Formerly Spanish 250, 2534)

Readings of representative authors of Spain. Offered by demand.

217-450. La Cultura Hispanica Credit 3(3-0) (Formerly Spanish 301, 2543)

A course which covers the significant elements of Hispanic Civilization: geography, history, literature, and economics of the Spanish people. Offered by demand.

217-451. Survey of Spanish Literature I Credit 3(3-0) (Formerly Spanish 302, 2544)

A survey of Spanish literature from the Cid through the golden age with assigned readings and reports. Offered by demand.

217-452. Survey of Spanish Literature II Credit 3(3-0) (Formerly Spanish 303, 2545)

A survey of Spanish literature from the seventeenth century to the present. Offered by demand.

217-455. Syntax Credit 3(3-0) (Formerly Spanish 304, 2546)

Systematic study of Spanish grammar with conversational and other exercises based on contemporary authors. Offered by demand.

GERMAN

217-102. Elementary German I* Credit 3(3-0) (Formerly German 101, 102, 2502)

Fundamentals of pronunciation and grammar. Attention given to prepared and sight translations and vocabulary building. Offered in Fall and Spring.

217-103. Elementary German II* Credit 3(3-0) (Formerly German 102, 103, 2503)

Continuation of emphasis on grammar, vocabulary building, prepared and sight translations. Maximum attention given to graded readings in German prose and drama. Offered in Fall and Spring.

217-202. German Readings in the Natural Social Sciences and Technical Fields Credit 3(3-0) (Formerly German 205, 206, 2529, 425)

Individualized readings in the Natural, Social Sciences and Technical fields for students desirous of developing competence in German. Offered in Fall or Spring and by demand.

217-420. Conversational German Credit 3(3-0) (Formerly German 201, 2526)

Intensive practice in everyday German is provided. Prerequisites: German 102, 103, or approval of instructor. Offered by demand.

217-422. Intermediate German I Credit 3(3-0) (Formerly German 202, 2527)

This course is open to students who have completed German 102 and 103. The students read a cross-section of the simple writings in German literature and German newspapers. Offered in Fall or Spring and by demand.

217-423. Intermediate German II Credit 3(3-0) (Formerly German 203, 2528)

Continuation of German 422. Readings from German literature. Offered in Fall or Spring and by demand.

217-427. Survey of German Literature Credit 3(3-0) (Formerly German 2530)

A general introduction to the study of German literature. This course is intended to give an over-all picture of German literature and an opportunity to read outstanding works not offered in other German courses. Offered by demand.

*Students are required to purchase supplemental materials for this course.

RUSSIAN

- 217-106. Elementary Russian I*** Credit 3(3-0)
(Formerly Russian 2506)

An elementary course for beginners which consists of grammar translation, practice in pronunciation and limited use of the spoken language. Prerequisite: None. Course offered on demand.

- 217-107. Elementary Russian II*** Credit 3(3-0)
(Formerly Russian 2507)

Continuation of Elementary Russian 106. Attention is given to more advanced grammar. Reading in Russian is stressed. Prerequisite: Russian 106. Course offered on demand.

DEPARTMENT OF HISTORY Peter V. Meyers, Chairperson

- 233-100. History of World Civilizations—
Part I*** Credit 3(3-0)

A survey of the social, political, economic, religious, and cultural developments in world civilizations from the beginnings in the ancient world through the 16th century.

- 233-101. History of World Civilizations—
Part II*** Credit 3(3-0)

A continuation of the social, political, economic, religious, and cultural developments in world civilizations from the 17th century to the present.

- 233-204. U.S. History From 1492-1877** Credit 3(3-0)

Examines the basic diplomatic, political, economic and socio-cultural forces in the formation and development of the United States to 1877. Emphasis is placed upon political developments within a broad economic, social and cultural context.

- 233-205. U.S. History Since 1877** Credit 3(3-0)

Continues the examination of basic diplomatic, political, economic and socio-cultural forces in the development of the United States since 1877. Study of these major historical elements is pursued in an effort to help students to better understand the problems and challenges of contemporary American life, both domestic and foreign.

- 233-208. History of North Carolina** Credit 3(3-0)

A general survey of North Carolina from colonial times to the present.

- 233-209. The American Military
Experience** Credit 3(3-0)

This course is designed primarily to enable the student to understand better the role played by the armed forces in American society today through a study of the origins and development of military institutions, traditions, and practices in the United States, 1775 to the present.

- 233-215. History of Africa to 1800** Credit 3(3-0)

A general survey of the history of Africa to 1800. Major areas of study include: the genesis of man in Africa, in the ancient world, early East and West civilizations, and the coming of Europe.

- 233-216. History of Africa Since 1800** Credit 3(3-0)

A general survey of the history of Africa since 1800. Major areas of study include: the slave trade, the underdevelopment of Africa, Western imperialism and the African partition, and the growth of nationalism.

- 233-220. History of Science and
Technology** Credit 3(3-0)

A survey of major scientific discoveries and technological innovations since the Scientific Revolution. Special attention will be paid to the Newtonian mechanistic world view, theories of evolution, relativity, industrial revolution, medical advances, nuclear energy, computers and robotics. The social, economic, and ethical impact of modern scientific and technical discoveries will also be discussed.

- 233-250. The Nature, Study, and
Writing of History** Credit 3(3-0)

The course includes material and presentations leading to an understanding of the basic nature of history, how to study it, methods and techniques in researching and writing it, basic computer and quantification skills, and more summarily, historiography and philosophies of history.

- 233-300. Ancient History** Credit 3(3-0)

A history of civilizations from the beginnings in the Near East and Egypt through Hellenism and the Roman Empire.

- 233-302. The Pre-Modern West** Credit 3(3-0)

A survey of major developments in the Mediterranean and Western Europe from the origins of the Roman Empire through the end of the Middle Ages.

- 233-303. Early Modern Europe:
Renaissance to 1815** Credit 3(3-0)

A survey of major trends in the development of early modern Europe. Topics to be discussed include: Renaissance, Reformation, Scientific Revolution, Enlightenment, Absolutism, and the French Revolution.

- 233-304. Modern Europe Since 1815** Credit 3(3-0)

A survey emphasizing main trends in European development including political and social impact of the French Revolution, Industrial Revolution, authoritarianism vs. liberalism, church vs. state, nationalism, imperialism, World Wars I and II, Communism, Nazism, and present-day Europe.

- 233-305. Socialism Since Karl Marx** Credit 3(3-0)

This course analyzes the transformation of socialist thought and practice since the time of Marx. Special attention will be devoted to Marxist doctrines, nineteenth century Revisionism, Social Democracy, and twentieth century Communism.

- 233-306. History of Women Since 1800** Credit 3(3-0)

This course will trace the changes in female self-images and roles since the early 19th century in Europe and the United States. It will concentrate upon the growth of new educational and occupational opportunities for women, changing concepts of motherhood, and the rise of female protest movement.

- 233-307. The Historical Origins of
Environmental Crises** Credit 3(3-0)

This course will deal with man's changing philosophical and technological relationship with his natural environment since the start of the Industrial Revolution.

- 233-310. The Afro-American in the United States to 1877** Credit 3(3-0)
A survey of the history of Afro-Americans in the United States from the African background through the Civil War. Emphasis is on American slavery, the abolition movement, the free black community, Civil War, Emancipation, and Reconstruction.
- 233-311. The Afro-American in the United States Since 1877** Credit 3(3-0)
(A continuation of History 310)
Emphasis is placed upon Afro-American leadership, organizations, achievement, and the struggle of blacks for equality in America since 1877.
- 233-312. History of Religions** Credit 3(3-0)
A course that surveys the origin and development of the traditional religions of India and China and the three "Religions of the Book:" Judaism, Christianity, and Islam.
- 233-327. History of Latin America** Credit 3(3-0)
A survey of the history of Latin America from the pre-Columbian civilizations through the colonial empires and independence to the present day.
- 233-328. U.S. Slavery, 1619-1865** Credit 3(3-0)
A survey of the development of the institution of slavery in the United States from the seventeenth century to the ratification of the Thirteenth Amendment in 1865. Major themes stressed will include: slavemongering, slavery as a labor system, profitability of slavery, slave society, slave resistance to his status, and psychology of slaveholders.
- 233-330. History of the Far East to 1800** Credit 3(3-0)
A study of the history and culture of the Chinese, Japanese, and Vietnamese peoples from the early classical civilizations to the middle Ch'ing.
- 233-331. History of the Far East Since 1800** Credit 3(3-0)
Areas of study include: traditional China under the Ch'ing, the impact of the West, feudal Japan, modernization in Meiji Japan, the Chinese Revolutions, and the Chinese model in Vietnam.
- 233-332. The Modern Middle East** Credit 3(3-0)
This course will focus on the Middle East from the mid 19th century to present. Areas of study will include: the nature of Islamic society; the rise of nationalism and independence movements; the creation of the state of Israel, and the Arab-Israeli conflict.
- 233-334. Honors in History** Credit 3(3-0)
Intensive reading and study or research in the field of history for departmental majors with a 3.0 average.
- 233-401. Old Testament History and Literature** Credit 3(3-0)
A survey of the books sacred to Judaism, Christianity, and Islam commonly called the Old Testament, in the context of the history of the people of Israel who composed them.
- 233-402. The Rise of Christianity** Credit 3(3-0)
A historical study of the origins and development of the Christian Church from its beginnings to the end of the ancient world (around 476 A.D.). The political, social, economic, intellectual, and religious environment will be considered equally along with the internal development of Christian institutions, beliefs, and practices.
- 233-405. History of England** Credit 3(3-0)
This course concentrates on English history since 1688. Special attention is given to the following topics: Glorious Revolution, industrialization, imperialism, decolonization, Victorianism, Ireland, and the current crisis in English society.
- 233-407. American Diplomatic History Since 1900** Credit 3(3-0)
American foreign policy and diplomacy from the Spanish American War to the present. Emphasis on the impact of foreign policy upon domestic (U.S.) society and the growing involvement of the U.S. in international relations. Students are encouraged to understand fully and think critically about America's role in the world.
- 233-410. American Constitutional History** Credit 3(3-0)
Development of American constitutionalism from English origins to the present. Emphasis on the development of separation of powers, states' rights, the Supreme Court, and the sectional controversy, economic regulations, and the modernization of the Bill of Rights, especially problems of desegregation, free speech, obscenity and criminal justice.
- 233-412. Modernization in Africa from 1920 to the Present** Credit 3(3-0)
The study of African development since World War I. Areas of study include: nationalism and independence movement, conflicts between traditional and modern ideas, United States and African relations, and racism in Southern Africa.
- 233-416. History of Black Culture in the United States** Credit 3(3-0)
Focus on early cultural developments, folk culture, and religion in antebellum America, social and cultural trends in the twentieth century, the "Harlem Renaissance," and urban life.
- 233-420. Seminar: Urban America** Credit 3(3-0)
Special topics in the rise of the American city and the development of urban patterns of life, concentration on such themes as population shifts to cities, the development of slums and ghettos, growth of municipal institutions and services, and the relationship of government with city residents. Prerequisite: History 205 and consent of the instructor.
- 233-430. Topics in Twentieth Century American History** Credit 3(3-0)
In depth analysis of selected topics since the late nineteenth century, with special emphasis on written historical communication. Prerequisites: 6 hours of American history (204 and 205) and the consent of the instructor.
- 233-442. Russian and Soviet History** Credit 3(3-0)
The history of Russia and the Soviet Union from the earliest times to the present, with emphasis on the twentieth century.

233-450. Modernization in Historical Perspective Credit 3(3-0)

This course concentrates on an analysis of the various paths to modernity taken by several advanced societies, notably the United States, England, France, Germany, Russia, and Japan. Particular attention will be devoted to the causes and effects of industrialization, population growth, urbanization, social protest, changes in family structure, intellectual responses to rapid change, and the development of the modern state.

231-536. Methods of Teaching Social Sciences** Credit 3(3-0)

A study of techniques of social science instruction on the high school level. Required of those planning to teach the subject. Prerequisites: 27 semester hours of Social Studies and 15 semester hours of Education and Psychology.

Advanced Undergraduate and Graduate

233-600. The British Colonies and the American Revolution Credit 3(3-0)

The planting and maturation of the English colonies of North America. Relationships between Europeans, Indians, and transplanted Africans, constitutional development, religious ferment, and the colonial economy are studied.

233-603. Civil War and Reconstruction Credit 3(3-0)

Causes as well as constitutional and diplomatic aspects of the Civil War, the role of the Afro-American in slavery, in war, and in freedom; and the socio-economic and political aspects of Congressional Reconstruction and the emergence of the New South are studied.

233-605. Seminar on the Soviet Union Credit 3(3-0)

A seminar course on the Soviet Union including extensive reading and discussion and a major research paper.

233-606. U.S. History, 1900 - 1932 Credit 3(3-0)

Emphasizes political, economic, social, cultural and diplomatic developments from 1900 to 1932 with special attention to their effect upon the people of the United States and their influence on the changing role of the U.S. in world affairs.

233-607. U.S. Since 1932 - Present Credit 3(3-0)

With special emphasis on the Great Depression, New Deal, the Great Society, and the expanding role of the United States as a world power, World War II, Cold War, and Korean and Vietnam conflicts are studied. Major themes include the origin, consolidation, and expansion of the New Deal, the growth of executive power, the origins and spread of the Cold War, civil liberties, and civil rights, and challenges for the extension of political and economic equality and the protection of the environment.

233-615. Seminar in the History of Black America Credit 3(3-0)

A reading, research, and discussion course which concentrates attention on various aspects of the life and history of Afro-Americans. Emphasis is placed on historiography and major themes which include nationalism, black leadership and ideologies, and economic development.

233-616. Seminar in African History Credit 3(3-0)

Research, writing and discussion on selected topics in African history.

233-617. Readings in African History Credit 3(3-0)

By arrangement with instructor.

233-620. Seminar in Asian History Credit 3(3-0)

Research, writing, and selected topics in Asian history.

****Education 536 is required for undergraduate students seeking certification in history or the social sciences.**

233-625. Seminar in Historiography and Historical Method Credit 3(3-0)

The study of the writing of history as well as training in research methodology and communication, including basic computer and quantification skills.

233-626. Revolutions in the Modern World Credit 3(3-0)

A seminar course stressing comparative analysis of revolutions and revolutionary movements in the United States, France, Russia, China, Cuba, and Iran. Students will also evaluate theories of revolution in light of historical examples.

233-630. Studies in European History, 1815-1914 Credit 3(3-0)

Intensive study of selected topics in Nineteenth Century European history.

233-631. Studies in Twentieth Century Europe, 1914 - Present Credit 3(3-0)

Intensive study of selected topics including World Wars I and II, the Russian Revolution, Hitler and the Holocaust, the Depression, the threat of nuclear war, the Welfare State, and the Solidarity movement in Poland.

233-633. Independent Study in History Credit 3(3-0)

By arrangement with instructor.

237-645. American Foreign Policy—1945 - Present* Credit 3(3-0)

Examination of forces and policies that have emerged from Potsdam, Yalta, and World War II. Emphasis will be on understanding the policies that were formulated, why they were formulated, the consequences of their formulation, and the alternative policies that may have come about. Prerequisite: Survey course in American history, American Diplomatic history or consent of instructor.

Graduate

233-701. Recent United States Diplomatic History Credit 3(3-0)

Episodes in the history of American foreign relations that were especially important in influencing persistent patterns of this nation's role in international relations. Possible examples studied: Pearl Harbor, the Cold War, Korean War, Cuban missile crisis, Vietnam, nuclear arms limitation, and black Africa.

*Political Science 645 and 730 are accepted for history credit.

233-712. The Black American in the Twentieth Century Credit 3(3-0)

Research, reading, discussion, and an analysis of major facets of black life in the United States from 1900 to the present. Requires a major research paper.

233-730. Seminar in History Credit 3(3-0)

Topics to be selected by students and instructor. Includes a major research project.

237-730. Constitutional Development Since 1865* Credit 3(3-0)

Historical study of the development of the Constitution since 1865. Treatment will be given to important Constitutional decisions, major documents, major Supreme Court decisions, and public policy. Assignments in paperback books will be frequent.

233-740. History, Social Sciences, and Contemporary World Problems Credit 3(3-0)

Readings, discussions, and reports on the relationships between history and the social sciences as a whole, as well as their combined roles in dealing with contemporary world problems.

233-750. Thesis in History Credit 3(3-0)

Thesis work will be done with the appropriate instructor in accordance with field of interest.

311-725. Problems and Trends in Teaching the Social Sciences*** Credit 3(3-0)

Current strategies, methods, and materials for teaching the social sciences. Emphasis on innovations, evaluation and relation to learning. Provision for clinical experiences.

PHILOSOPHY

233-260. Introduction to Philosophy* Credit 3(3-0)

An introductory course covering such topics as theories of reality, the nature in mind and knowledge, and the higher values of life.

233-261. History of Philosophy* Credit 3(3-0)

The history of philosophic thought is traced from ancient Greek philosophers to modern philosophers through Hegel.

233-262. Logic* Credit 3(3-0)

An introductory course designed to give a critical analysis of the principles, problems and fallacies in reasoning.

*General Education courses.

**Education 725 is required for graduate students seeking a master's degree.

233-308. Culture and Value Credit 3(3-0)

A critical study of the nature and justification of basic ethical concepts in light of historical thought.

233-309. Contemporary Philosophy Credit 3(3-0)

A critical investigation of some contemporary movements in philosophy with special emphasis on existentialism, pragmatism, and positivism.

*Students are required to purchase supplemental materials for this course.

†General Education course.

GEOGRAPHY

233-200. Principles of Geography* Credit 3(3-0)

A survey of the principles of geography.

233-210. World Regional Geography Credit 3(3-0)

A survey of the geographic character of the major cultural regions of the world. Contemporary cultural characteristics are examined within the framework of both environmental relationships and historical development.

233-319. Regional Geography of the United States and Canada Credit 3(3-0)

A study of geographic regions of the United States and Canada.

233-322. Economic Geography Credit 3(3-0)

A geographical survey of major economic activities: agriculture, forestry, fishing, mining, manufacturing, and commerce. Emphasis is placed upon areal patterns of production and exchange.

Undergraduate and Graduate

233-640. Topics in Geography of the United States and Canada Credit 3(3-0)

Selected topics in cultural geography of the United States and Canada are studied intensively. Emphasis is placed upon individual reading and research and upon group discussion.

233-641. Topics in World Geography Credit 3(3-0)

Selected topics in geography are studied intensively. Concern is for cultural characteristics and their interrelationships with each other and with habitat. Emphasis is upon reading research, and discussion.

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Wendell P. Jones, Chairperson

225-100. Intermediate Mathematics Credit 3(3-0)

Elementary properties of real numbers and basic algebra through solving of quadratic equations by various means. Required of students whose mathematics SAT scores are low and whose major curriculum includes either Mathematics 10 or Mathematics 111.

255-101. Fundamentals of Algebra and Trigonometry I* Credit 3(3-0)

Numbers and their properties, polynomials, rational expressions, rational exponents, radicals, equations and inequalities in one variable, relations and functions. Prerequisite: A satisfactory score on the mathematics portion of the Scholastic Aptitude Test or Mathematics 100.

225-102. Fundamentals of Algebra and Trigonometry II* Credit 3(3-0)

A continuation of Mathematics 101. Quadratic functions, systems of linear equations, exponential and logarithmic functions, circular functions, trigonometric functions, analytical trigonometry and the binomial theorem. Prerequisite: Mathematics 101.

- 225-110. Pre-Calculus for Engineers and Scientists** Credit 4(4-2)
Algebraic properties of the number system, fundamental operations, exponents and radicals, functions and graphs, solutions of equations and systems of equations, trigonometric functions and identities, inequalities, logarithms, progressions, mathematical induction, binomial theorem, permutations and combinations. Prerequisite: One unit of high school algebra and one unit of high school geometry.
- 225-111. College Algebra and Trigonometry*** Credit 4(4-0)
Review of basic algebra; first and second degree equations; polynomial and rational functions; systems of equations; inequalities, right triangle trigonometry; and trigonometric identities and equations. Prerequisites: Mathematics 100 or two units of high school algebra, one unit of high school geometry and a satisfactory score on the mathematical portion of the Scholastic Aptitude Test.
- 225-112. Calculus for Non-Mathematics Majors** Credit 4(4-0)
A brief treatment of basic concepts of differential and integral calculus with applications to business, economics, social and behavioral sciences; polynomial, rational, exponential and logarithmic functions. Prerequisite: Mathematics 102, 110, or 111.
- 225-115. Mathematics of Business and Finance** Credit 3(3-0)
A brief review of computing with whole numbers, decimals, fractions, per cent, problem solving and the metric system. Simple interest, discount, partial payments, payroll, wages and commission accounts, discounts and mark-ups, retailing, taxes, distribution of ownership, transactions in corporate securities, insurance, compound interest, annuities, amortization and sinking funds. Prerequisite: Mathematics 101, 110, or 111.
- 225-123. Discrete Mathematics I** Credit 3(3-0)
An introduction to applied discrete mathematics. Topics include set theory, introduction to logic, functions, recursion, relations, properties of integers, and elementary matrix algebra. Prerequisite: Mathematics 110 or equivalent.
- 225-131. Calculus I** Credit 4(4-0)
Limits and continuity of functions, the derivative, applications of the derivative, the definite integral and applications of the definite integral. Prerequisite: Mathematics 110 or appropriate approval.
- 225-132. Calculus II** Credit 4(4-0)
Topics in analytic Geometry, differentiation and integration of exponential, logarithmic, trigonometric, inverse trigonometric and hyperbolic functions, additional techniques and applications of integration, indeterminate forms, improper integrals, Taylor's Formula and infinite series. Prerequisite: Mathematics 131.
- 225-160. Introduction to Computer Science** Credit 3(3-0)
A beginning course in computer science covering topics in the history of computers, machine organization, problem formulation, the concept of an algorithm, and the use of flow to depict algorithms, machine language, programming and applications of computers. Prerequisite: None.
- 225-223. Discrete Mathematics II** Credit 3(3-0)
Principles and techniques of discrete mathematics, a continuation of Mathematics 123. Topics include Boolean algebra and applications elementary graph theory, trees and applications, and mathematical techniques for algorithm analysis. Prerequisite: Mathematics 123.
- 225-224. Introduction to Probability and Statistics** Credit 3(3-0)
A general course-covering fundamentals of statistics, central tendencies, variabilities, graphic methods, frequency distributions, correlations, reliability of measures, theory and methods of sampling and descriptive and analytical measures of statistics. Prerequisite: Mathematics 111.
- 225-231. Calculus III** Credit 4(4-0)
Partial differentiation, differential equations, plane curves and polar coordinates, vectors and solid geometry, vector-valued functions, multiple integrals and applications of multiple integrals. Prerequisite: Mathematics 132.
- 225-240. Introduction to the Programming of Digital Computers** Credit 3(3-0)
Flow charts, machine language, e.g. FORTRAN; preparation of cards and tapes, number systems, typical programs for solution on standard computers; mathematical essentials for computer programming, e.g., approximation methods, error functions, iteration schemes and numerical solutions of equations. Prerequisite: Mathematics 102, 110, or 111.
- 225-242. College Geometry** Credit 3(3-0)
Postulational systems, Euclid's Parallel Postulate, a brief study of non-Euclidean geometries, Euclidean geometry as a special case of other geometries and defects of Euclid's system. Prerequisite: Mathematics 132.
- 225-260. Computer Language: PASCAL** Credit 3(3-0)
Fundamentals of programming in PASCAL, with emphasis on problem solving and algorithm development, through the technique of stepwise refinement. Prerequisite: Computer Science 160.
- 225-280. Conversational PL/1 Programming** Credit 3(3-0)
Application to a broad range of problems of block structured language which incorporates most of the features of ALGOL, FORTRAN, and COBOL. Prerequisite: C-160.
- 225-331. Introduction to Applied Mathematics I** Credit 3(3-0)
Laplace transforms, vector analysis, complex variables and line integrals. Prerequisite: Mathematics 231.
- 225-332. Introduction to Applied Mathematics II** Credit 3(3-0)
Fourier series, partial differential equations, complex variables, Taylor and Laurent series and residue theory. Prerequisite: Mathematics 331.
- 225-350. Linear Algebra and Matrix Theory I** Credit 3(3-0)
An introduction to linear algebra and matrix theory; the algebra of matrices and its application to the solutions of systems of linear equations, determinants, real and complex vector spaces, bases, dimension, linear transformations, eigenvalues and eigenvectors. Prerequisite: Mathematics 132.

*Students are required to purchase supplemental materials for this course.

- 225-355. Algorithmic Analysis and Advanced Pascal (Formerly 265) Credit 3(3-0)**
Advanced structured programming in PASCAL; arrays, records, sets, files, and pointers; linked list processing; recursion, sorting and searching; algorithmic analysis. Prerequisite: Computer Science 260.
- 225-380. Data Structures (Formerly 270) Credit 3(3-0)**
A study of abstract data structures, covering the specifications and implementations of stacks, queues, trees, graphs, and other selected abstract data types; applications such as hashing, prefix and postfix notation, and priority queues. Prerequisite: Computer Science 355.
- 225-385. Systems Analysis and Design Using COBOL (Formerly 250) Credit 3(3-0)**
Fundamentals of programming in COBOL with special emphasis on business applications. Topics include the rudiments of systems analysis and design, data validation, level control break reports, and sequential and indexed sequential file processing. Prerequisite: Computer Science 355.
- 225-420. History of Mathematics Credit 3(3-0)**
A survey of the development of mathematics by chronological periods with biographical references, illustrations of national and racial achievements and discussion of the evaluation of certain important topics of elementary mathematics. Prerequisite: Mathematics 231.
- 225-423. Theory of Equations Credit 3(3-0)**
Methods of solving cubics, quartics and other algebraic equations; methods of approximating roots; systems of equations; and, elements of determinants and matrices. Prerequisite: Mathematics 132.
- 225-440. Numerical Methods Credit 3(2-2)**
Numerical methods as related to programming techniques, interpolation, extrapolation, approximate solutions of algebraic and transcendental equations, simultaneous linear equations, initial-value, characteristic-value and boundary-value problems, partial differential equations of the hyperbolic, parabolic and elliptic types. Corequisite: Mathematics 240.
- 225-460. Numerical Analysis Credit 3(3-0)**
An introduction to principles and techniques of numerical mathematics. Topics in round-off error analysis, the approximation of functions, derivatives and integrals, and the numerical solution of non-linear equations, ordinary differential equations and the systems of linear equations. Prerequisite: Mathematics 231, Mathematics 240 and Mathematics 350.
- 225-465. Programming Language Principles (Formerly 365) Credit 3(3-0)**
Comparative study of the principles underlying the design and implementation of programming languages. In-depth treatment of formal and informal syntax and semantics of programming languages. Application oriented team projects. Prerequisite: Computer Science 380.
- 225-470. Assembly Language Programming (Formerly 370) Credit 3(3-0)**
Principles of machine language programming, organization of computers and its effect on computer software, interpretation and assembly language translation. Prerequisite: Computer Science 380.
- 225-475. Switching Theory and Computer Organization (Formerly 375) Credit 3(3-0)**
An introduction to the internal design and operations of a digital computer; Combinational and sequential logic; Components of the CPU, special registers, general purpose registers, arithmetic logic unit, control unit. Machine language, instruction execution, addressing techniques. Memory, RAM, ROM cache, virtual memory. Input/output, data transfer, addressing devices, interrupt handling. Prerequisite: Computer Science 470, and Mathematics 223.
- 225-490. Software Engineering Using ADA (Formerly 290) Credit 3(3-0)**
Complete overview of the Ada programming language, data types in Ada, program and software design using features such as packages, libraries, private types, generics, exception handling, and parallel processing. Prerequisite: Computer Science 380.
- 225-505. Seminar in Mathematics Credit 1(1-0)**
Methods of preparing and presenting seminars, presentation of seminars in current developments in mathematics and/or topics of interest which are not included in formal courses. Required for mathematics majors. Prerequisite: Mathematics 507 or 511.
- 225-507. Intermediate Analysis I Credit 3(3-0)**
A rigorous treatment of the fundamental principles of analysis, limits, continuity, sequences, series, differentiability and integrability and functions of several variables. Prerequisite: Mathematics 231.
- 225-508. Intermediate Analysis II Credit 3(3-0)**
A continuation of Mathematics 507. Prerequisite: Mathematics 507.
- 225-511. Abstract Algebra I Credit 3(3-0)**
Elementary properties of sets, Peano axioms, the natural number system, properties of the integers, groups, rings, integral domains, fields and vector spaces. Prerequisite: Twenty hours of college mathematics.
- 225-512. Abstract Algebra II Credit 3(3-0)**
A continuation of Mathematics 511 including topics in commutative ring theory, Galois field theory and module theory. Prerequisite: Mathematics 511.
- 225-520. Linear Algebra and Matrix Theory II Credit 3(3-0)**
Vector spaces, properties of finite dimensional vector spaces, linear transformations and matrices, determinants and systems of linear equations, eigenvalues and eigenvectors, diagonalization, inner product spaces and bilinear quadratic forms. Prerequisite: Mathematics 350 or consent of the instructor.
- 225-550. Vector Analysis Credit 3(3-0)**
Vector and tensor calculus, covariant and contravariant components; integral theorems; applications to geometry, mechanics and electromagnetic theory. Prerequisite: Mathematics 331.
- 225-560. Systems Programming Credit 3(3-0)**
Principles underlying the design and implementation of vendor supplied operating systems, assemblers, compilers and editors. Introduction to basic software, firmware, and hardware components of computer systems. Exploration of systems programming problems. Prerequisite: Computer Science 475.

225-570. Data Base Design **Credit 3(3-0)**

Logical and physical organizations of large sets of related data. Introduction to file structures, file and database management systems. In-depth treatment of relational, hierarchical and directed graph data models, data definition and manipulation languages, and relational calculus. Application oriented projects. Prerequisite: Computer Science 380 and 385.

225-585. Theoretical Aspects of Computing **Credit 3(3-0)**

Algebraic structures, coding theory, theory of finite state machine and automata, machine design and construction, context free-languages, computability and computational complexity. Prerequisite: Computer Science 465 and 475.

Advanced Undergraduate and Graduate

225-600. Introduction to Modern Mathematics for Secondary School Teachers **Credit 3(3-0)**

Elementary theory of sets, elementary logic and propositional systems, nature and methods of mathematical proofs, structure of the real number system. Evaluation of instructional software. Use of computer integrated instruction to teach pertinent concepts to the teacher of secondary school mathematics. Prerequisite: Consent of the instructor.

225-601. Algebraic Equations for Secondary School Teachers **Credit 3(3-0)**

Algebra of sets, algebraic equations, systems of equations, matrices and determinants with applications, and the elements of vector spaces. Prerequisite: Mathematics 600 or consent of the Department of Mathematics and Computer Science.

225-602. Modern Algebra for Secondary School Teachers **Credit 3(3-0)**

Sets and mappings, properties of binary operations, groups, rings, integral domains, vector spaces and fields. Prerequisite: Mathematics 600 or consent of the Department of Mathematics and Computer Science.

225-603. Modern Analysis for Secondary School Teachers **Credit 3(3-0)**

Properties of the real number system, functions, limits, sequences, continuity, differentiation, integration, logarithmic and exponential functions. Prerequisite: Mathematics 600 or consent of the Department of Mathematics and Computer Science.

225-604. Modern Geometry for Secondary School Teachers **Credit 3(3-0)**

Re-examination of Euclidean geometry, axiomatic systems and the Hilbert axioms, introduction to projective geometry and other non-Euclidean geometries. Prerequisite: Mathematics 600 or consent of the Department of Mathematics and Computer Science.

225-606. Mathematics for Chemists **Credit 3(3-0)**

Review of those principles of mathematics which are involved in chemical computations and derivations from general chemistry through physical chemistry; topics covered include significant figures, methods of expressing large and small numbers, algebraic operations, trigonometric functions and an introduction to calculus.

225-607. Theory of Numbers **Credit 3(3-0)**

Divisibility properties of the integers, the Euclidean algorithm, congruences, diophantine equations, number-theoretic functions and continued fractions. Prerequisite: Twenty hours of college mathematics.

225-608. Mathematics of Life Insurance **Credit 3(3-0)**

Probability, mortality tables, life insurance, annuities, endowments, computation of net premiums, evaluation of policies, construction and use of tables. Prerequisite: Mathematics 224.

225-620. Elements of Set Theory and Topology **Credit 3(3-0)**

Operations on sets, indexed families of sets, products of sets, relations, functions, metric spaces, general topological spaces, continuity, compactness and connectedness. Prerequisites: Mathematics 231 and consent of the instructor.

225-623. Advanced Probability and Statistics **Credit 3(3-0)**

Review of elementary postulates and theorems of probability; probability functions, probability densities, mathematical expectation, moments of special probability distributions, moment generating functions, sampling distributions, decision theory and estimations. Prerequisites: Mathematics 224 and Mathematics 231.

225-624. Methods of Applied Statistics **Credit 3(3-0)**

Review of various statistical procedures; applications of normal, binomial, Poisson, chi-square, student's "t" and "F" distributions; analysis of variance, covariance and regression analysis based on available packaged computer programs; factor analysis, discriminant analysis and the analysis of categorical data using linear models. Prerequisite: Mathematics 224.

225-625. Mathematics for Elementary Teachers, K-8, I **Credit 3(3-0)**

Designed for in-service and prospective teachers who have as their goal "to teach the basic skills and competencies of mathematics sought in today's world." The course emphasizes that the teacher, first, must have the knowledge and skills in order to accomplish this goal. It stresses fundamentals of arithmetic, sets and operations, number systems, fractions, decimals, percents, estimation, consumer arithmetic, problem solving and traditional and metric geometry and measurement. This course may not be used for degree credit.

225-626. Mathematics for Elementary Teachers, K-8, II (Formerly 3686) **Credit 3(3-0)**

A continuation of Mathematics 625. No credit towards a degree in mathematics; not open to secondary school teachers of mathematics. Credit on elementary education degree. Prerequisite: Mathematics 625.

225-631. Linear and Non-Linear Programming **Credit 3(3-0)**

Optimization subject to linear constraints; transportation problems; simplex method, network flows, applications of linear programming to industrial problems and economic theory. introduction to non-linear programming. Prerequisite: Mathematics 350 and consent of the instructor.

225-632. Games and Queue Theory Credit 3(3-0)

General introduction to game theory; two-person-non-zero-sum-non-cooperative games; two-person cooperative games; reasonable outcomes and values; the minimax theorem. Introduction to queuing theory; single server queuing processes; many serve queuing processes; applications to economics and business. Prerequisite: Mathematics 224, Mathematics 350, or consent of the instructor.

225-651. Methods in Applied Mathematics I Credit 3(3-0)

An introduction to complex variables and residue calculus, transform calculus (Fourier, Laplace, Hankel, Mellin, etc. Transforms), higher order partial differential equations governing various physical phenomena, non-homogeneous boundary value problems, orthogonal expansions, Green's functions and variational principles. Prerequisite: Mathematics 331 and 332.

225-652. Methods of Applied Mathematics II Credit 3(3-0)

An introduction to integral equations and conversion of differential problems into integral equations of Volterra and Fredholm types, solution by iteration and other methods, existence theory, eigenvalue problems, Hilbert-Schmidt theory of symmetric kernels and topics in the calculus of variation, including optimization of integrals involving functions of more than one variable, Hamilton's principles, Strum-Liouville theory, Rayleigh-Ritz methods, etc. Prerequisite: Mathematics 331 and 332.

225-660. Computer-Science for Secondary School Teachers Credit 3(3-0)

The history, nature and use of computers. The goals and principles of teaching computer science in secondary schools. Development of skills in the use and development of computer-assisted instruction modules. Prerequisite: Consent of the instructor.

225-665. Principles of Optimization Credit 3(3-0)

Algebra, linear inequalities, duality, graphs, transport networks; linear programming; special algorithms; selected applications. An upper level course. Prerequisite: Mathematics 231 or equivalent and Mathematics 240 and 350.

225-670. Simulation Concepts and Languages Credit 3(3-0)

GPSS, SIMULA, CSMP and general purpose languages in their relationship with simulation in decision making. Application of these concepts to inventory, scheduling, queuing, job shop and gaming. Prerequisite: Mathematics 632 and one of C-260, C-280 or C-290.

225-675. Graph Theory Credit 3(3-0)

Varieties of graphs, graph theory algorithms, and applications of graph theory to other disciplines. Prerequisite: Mathematics 350.

225-680. Systems Analysis Techniques Credit 3(3-0)

Quantitative techniques using basic analytical models to aid system development, use of work sampling and data presentation techniques, construction of decision tables and flow charts, automated documentation theory and its applications, structured documentation and analysis. Prerequisite: Mathematics 224, C-375 and C-570.

225-690. Advanced Topics in Computer Science Credit 3(3-0)

Topics are selected from graphic and image processing, compiler construction, data base, system analysis, operating system and other fields of computer science. Prerequisite: Senior standing and consent of the instructor.

DEPARTMENT OF MUSIC
Clifford Watkins, Chairperson

MUSIC THEORY**219-101, 102. Theory I and II Credit 3(2-2)**

Review of the fundamentals of music, including the rudiments of music theory; construction and function of scales; intervals, triads and dominant seventh chords in root position and inversions; use of non harmonic tones; correlated analysis, rhythmic, melodic, harmonic, and keyboard drill.

219-119. Sight Singing and Ear Training Credit 1(0-2)

Fundamentals of musicianship; correlated rhythmic, melodic, and harmonic drills.

219-200, 201. Theory III and IV Credit 3(2-2)

Modulation, construction and function of seventh, ninth, eleventh, and thirteenth chords in root position and inversions; chromatic harmony; advanced modulation; trends of the twentieth century; corrected analysis, sight singing, ear training, dictation, and keyboard drill. Prerequisites: Music 101, 102.

219-400. Counterpoint Credit 3(3-0)

Strict counterpoint in two or more parts; imitation; two and three-part inventions; canon; forms based on the chorale; invertible counterpoint; the fugue. Prerequisite: Music 200, 201.

219-402. Form and Analysis Credit 3(3-0)

Harmonic and melodic structure of the phrase; phrases in combination; the analytical methods; theme and variation, ternary, rondo, binary, sonata, concerto and unique forms; the fugue and related genres. Prerequisites: Music 200, 201.

219-414. Composition Credit 3(2-2)

Introduction to the basic elements of creative writing; melodic writing; organization and structure of musical sound; various approaches to the development of thematic and harmonic materials; as well as orchestration as it applies to composition. Prerequisites: Music 101, 102, 200, 201, and/or with the permission of the instructor.

219-501. Arranging Credit 3(2-2)

Scoring for chorus, band, orchestra, vocal and instrumental chamber ensembles. Prerequisites: Music 400, 401.

MUSIC HISTORY AND LITERATURE**219-216. Music Appreciation I Credit 3(3-0)**

A study of melody, harmony, rhythm, simple forms, vocal music, texture and the orchestra. Designed for the general student to provide an introductory survey to the art of music.

219-217. Music Appreciation II Credit 3(3-0)

A survey of the literature and styles of the several periods of music history from antiquity through the present. Designed for the general student as a continuation of Music Appreciation I. Prerequisite: Music 216.

- 219-218. Introduction to Music Literature** Credit 2(2-0)
Familiarization of student with large body of musical material from all branches of musical writing; for vocal and instrumental, solo and ensemble, symphonic and choral groups. Special attention is given to style and structural procedures by principal composers. Designed for students with some musical background.
- 219-220. History of Black Music in America** Credit 3(3-0)
A study of black American music from the 17th century to the present. Emphasis is placed on musical forms and styles within the social, economic, and political areas. Formal musical training desirable but not required. Humanities credit given."
- 219-221. History of Jazz** Credit 3(3-0)
A general survey of the history of jazz from its beginnings to the present, with major emphasis placed on the stylistic and evolutionary development of the music and the significant contributors to jazz styles. Lectures will be supplemented by films, slides, demonstrations, live concerts, and phonograph recordings. Course is open to non-music majors as well as music majors. No formal knowledge of music theory and history, or previous background in music, is necessary for enrollment.
- 219-403. History and Literature of Music I** Credit 3(2-2)
Analyses of main works of music literature presented in historical order; form, harmonic, and contrapuntal devices, orchestration, and other stylistic features investigated against the background of historic artistic and cultural developments; Ancient, Medieval, Renaissance and Baroque periods. Prerequisites: 101, 102.
- 219-404. History and Literature of Music II** Credit 3(2-2)
Analysis of main works of music literature presented in historical order, form, harmonic and contrapuntal devices, orchestration, and other stylistic features investigated against the background of historic, artistic, and cultural development; Classical, romantic, Postromantic and contemporary periods. Prerequisite: 403.
- 219-405. Music of the Baroque Period** Credit 2(1-2)
Analysis of the main works of the principal composers of the early, middle, and late Baroque periods culminating with a more detailed study of the works of Handel and J.S. Bach; vocal, keyboard and other instrumental forms included; emphasis on stylistic characteristics. Prerequisite: Music 403.
- 219-406. Music of the Romantic Period** Credit 2(1-2)
Intensive study of the works of the principal composers of the Romantic era; emphasis on general and individual stylistic characteristics. Prerequisite: Music 404.
- 219-407. Modern Music from 1890 to the Present** Credit 2(1-2)
Music of the so-called Viennese school of the twentieth century against the background of late German romanticism and French impressionism; the dissolution of the tonal system and the development of the serial principle; the music of Bartok, Stravinsky and others in the light of nineteenth and twentieth century investigations of folk or national materials and their influence upon serious artist; the relationship of Bartok and Stravinsky to traditional harmonic principles and to the formal structures of the past; other trends in the twentieth century. Prerequisites: Music 201, 404.
- 219-408. The Symphony** Credit 2(1-2)
The formulation of classical principles of construction by Josef Haydn, with reference to the contributions of Gluck, C.P.E. Bach and the Mannheim school; the fulfillment of the classical ideal of the works of Mozart and Beethoven; changing concepts of the symphony after Beethoven; the Romanticists' approach to form; study of the major Romantic symphonies by composers from Schubert to Mahler. Prerequisites: Music 201, 404.
- 219-409. Keyboard Music** Credit 2(1-2)
Techniques, musicianship, and stylistic aspects of interpretation; from pre-Bach to the present; intellectual, emotional, and imaginative aspects of performance as exemplified by works from leading composers including Bach, Mozart, Haydn, Beethoven, Chopin, Schumann, Debussy, and Moussorgsky; all lectures illustrated at the piano. Prerequisite: Music 404.
- 219-410. Opera** Credit 2(1-2)
Establishment of the opera as a feasible musico-dramatic genre and the various solutions to problems of the opera as suggested by composers from the seventeenth to the twentieth centuries; special emphasis on the works of Monteverdi, Scarlatti, Gluck, Mozart, Wagner, and Verdi. Prerequisites: Music 201, 404.
- 219-411. The Art Song** Credit 2(1-2)
Survey of the art song from seventeenth century Italy to present, with special emphasis on the song literatures of Germany, France, and contemporary America; practice in interpretation with particular attention to style and diction. Prerequisite: music 404.
- 219-412. Chamber Music** Credit 2(1-2)
Analysis of masterworks of chamber literature for instrumental and vocal ensembles by the main composers for each of the several periods in music history; interpretation. Prerequisite: Music 404.

MUSIC EDUCATION

- 219-103. Class Piano for the Adult Beginner** Credit 1(0-2)
A programmed, audio-visual course of instruction in piano performance for beginners. Designed for the general college student, the course requires no previous experience with music.
- 219-104. Class Piano for the Adult Beginner II** Credit 1(0-2)
A continuation of Music 103. Prerequisite: Music 103.
- 219-105. Class Guitar I** Credit 1(0-2)
Basic instruction in guitar performance for the beginner using a programmed, audio-visual format. Designed for the general college student, the course requires no previous experience with music.
- 219-106. Class Guitar II** Credit 1(0-2)
A continuation of Music 105. Prerequisite: Music 105.

219-415. Electronic Music**Credit 2(2-0)**

This course is designed to introduce the student to electronic music and how it is created. Topics to be covered will be: the history of electronic music; the use and possible applications of the tape recorders, mixers, amplifiers, speakers, microphones, sound generators, synthesizers, etc.; and the proper maintenance of all the equipment utilized. Each student will arrange two or more hours per week to work alone in the Electronic Music Studio with the equipment and materials. The creation of original compositions will be a project assignment to be premiered at a public concert. Prerequisites: Music 101, 102, 200, 201.

219-424. Percussion Instruments**Credit 2(1-2)**

Playing of percussion instruments, basic techniques of snare drum, timpani, xylophone, bells, chimes, and other percussion instruments are presented and practiced.

219-425. Woodwind Instruments**Credit 2(1-2)**

Playing of woodwind instruments; basic techniques for clarinet, flute, oboe, saxophone, and bassoon are presented and practiced.

219-426. Brasswind Instruments**Credit 2(1-2)**

Playing of brasswind instruments; basic techniques for trumpet, French horn, Trombone, Euphonium and Tuba are presented and practiced.

219-427. Voice Class**Credit 1(0-2)**

Use of the singing voice; basic principles of singing, interpretation and musicianship; physiology, breathing; tone production, resonance and diction; application of basic principles to singing voice; pronunciation, articulation, intonation, attack, legato, sostenuto, flexibility and dynamics; ensemble singing; techniques for producing choral tone in accompanied and unaccompanied styles, choral procedure and repertoire.

219-428. Stringed Instruments**Credit 2(1-2)**

Study of the fundamentals of technique, tone production, methods, and materials pertaining to the violin, viola, cello, and double bass; culminating in heterogeneous string ensemble activities.

PERFORMANCE ORGANIZATIONS

The total number of semester hours to be earned through performance organization courses is specified in the outlines of major curricula. Each student with a major in music is required to maintain continuous membership in a departmentally sanctioned performance ensemble. If the principal applied subject is a wind or percussion instrument, the student must elect band; if the principal applied subject is voice or piano, the student must elect choir. The organization elected must be repeated each semester as specified until the required number of semester hours has been earned. Other performance organization courses are elected as required by the several curricula and similarly repeated for credit until the necessary semester hours have been earned.

219-300. University Band**Credit 2(0-5)**

The University Marching Band is organized in the fall of the year (first semester) and plays for all football games. It is open to all qualified students, both men and women. The Symphony Band functions after the football season and continues for the rest of the year. Membership in both the Symphony and Marching Bands is through audition with the Director of Bands. May be repeated for credit each semester.

219-301. University Choir**Credit 2(0-5)**

An organization designed to perform a diversity of choral literature ranging from the classics to gospel. Numerous on and off-campus public appearances, as well as at least one tour are planned each year. Membership is open to all qualified students by audition. May be repeated for credit.

219-302. Brass Ensemble**Credit 1(0-2)**

The study and performance of literature for brass instrument chamber groups from all periods of music history and in all styles. Frequent public concerts. Membership is open to all qualified students, both men and women through audition with the director. May be repeated for credit each semester.

219-303. Woodwind Ensemble**Credit 1(0-2)**

The study and performance of literature for woodwind chamber music groups and in all styles. Frequent public concerts. Memberships is open to all qualified students, both men and women through audition with the director. May be repeated for credit each semester.

219-304. Percussion Ensemble**Credit 1(0-2)**

The study and performance of literature for percussion chamber groups representing a wide variety of styles. Designed to develop skill in ensemble performance on all of the instruments of percussion used in this growing modern repertoire, membership is open to all qualified students, both men and women through audition with the director. Frequent public concerts. May be repeated for credit each semester.

219-305. Opera Workshop**Credit 1(0-2)**

Musical and dramatic group study and performance of excerpts from the operatic repertoire. Includes an annual production of a standard opera and/or contemporary chamber work, with staging, costumes, and scenery. Students must secure the approval of their university voice instructor before enrolling. May be repeated for credit each semester.

219-306. Chamber Singers**Credit 1(0-2)**

A choral organization designed to perform a wide variety of compositions written for voices representing various musical styles and periods. Frequent public concerts. Membership is open to qualified students through audition with the director. May be repeated for credit each semester.

219-307. Recital Seminar**Credit 0(0-1)**

A weekly assembly of music students with members of the faculty, providing opportunity for experience in public performance before an audience, lecture and discussion of problems in the general area of performance including ensemble playing and singing, conducting, accompanying, stage department, also performance. (Required of all music majors during each semester of residence; a grade of pass (P) or fail (F) will be assigned on the basis of participation and attendance.)

219-308. University Jazz Ensemble**Credit 1(0-2)**

The study and performance of jazz literature in all styles and idioms with special emphasis on contemporary compositions. Membership is open to all qualified students, both men and women through audition with the director. May be repeated for credit each semester.

219-309. University Orchestra**Credit 2(0-4)**

An organization designed to perform a wide range of orchestral compositions representing various musical styles, and periods. Emphasis is placed on the more important of the standard symphonic works from the eighteenth, nineteenth, and twentieth centuries. Membership is open to all qualified students, both men and women through audition with the director. May be repeated for credit each semester.

APPLIED MUSIC

Individual instruction is available in the following branches of applied music as both principal and secondary areas of study:

Piano	Flute	Bassoon	Trombone
Voice	Oboe	French Horn	Baritone Horn
Percussion	Clarinet	Trumpet	Tuba

In the principal area of performance, each student receives a one hour individual lesson each week and must practice for at least two (2) hours each day to earn two semester hours credit. To earn three semester hours credit, the student must practice a minimum of three hours each day in addition to his lesson. In the secondary area of performance, each student receives a one hour lesson each week and is required to practice a minimum of one hour each day to earn one semester hour credit. To earn two semester hours credit, each student must practice a minimum of two hours each day in addition to his lesson.

219-503. Score Reading and Conducting Credit 2(1-2)

Fundamental conducting beat patterns, size of beats, and use of each hand; discussion and study of musical terminology; conducting experience with laboratory group. Transposition; characteristics and ranges of instruments; study of tempos and dynamics; continued conducting experience with both choral and instrumental laboratory groups.

219-550. Senior Recital Credit 1(0-1)

Designed for the senior music major to demonstrate a high level of proficiency on a chosen instrument or in an applied music field (either brass, woodwinds, percussion, voice, strings, or keyboards) in a concert situation. The course will culminate in a formal concert performance of hallmarks of music literature. This course is taken concurrently with 513. For Music Education majors the recital should be presented the semester before student teaching occurs. For Bachelor of Arts majors, it should be presented during the second semester of Music 513. Prerequisites: Music 113, 213, 413.

219-114. Applied Music Secondary I Credit 1(0-1)

Semi-private or class study on a secondary instrument. Students whose principal performing medium is voice or one of the orchestral instruments are required to study the piano as the secondary instrument. Students whose principal performing medium is the piano may choose either voice or an orchestral instrument as the secondary instrument. Piano students pursuing the music education curriculum with a choral concentration must study voice as the secondary applied area. Emphasis is placed on the development of sound basic performance technique. May be repeated for credit. Two semesters are required.

219-214. Applied Music Secondary II Credit 1(0-1)

Continued development of basic performance skills that were begun in Music 114. Attention will be given to preparation for the comprehensive examination on the secondary instrument required of all students.

PIANO

Requirements for Admission — The applicants who elect piano as their principal instrument should be able to play all major and minor scales and arpeggios at a moderate tempo. They should play with technical ease and musical understanding, compositions equivalent in difficulty to the following: Clementi, *Sonatina*, Op. 36, No. 6; Mozart, *Fantasie in D Minor*, Bach, *Little Preludes*, or Burgmuller, *Studies*, Op. 100.

219-113. Piano

A three-part invention by Bach. A movement of a Sonata by Haydn, Mozart, or Beethoven. Work of moderate difficulty by a Romantic composer. Scales and arpeggios in parallel or contrary motion at a moderately rapid tempo. Sight Reading.

219-213. Piano

A prelude and fugue from the Well Tempered Clavier by Bach. Completion of the Sonata started in 113. A work from the Romantic school. A work written since 1900. Scales and arpeggios at rapid tempo. Sight reading.

219-413. Piano

Dance forms from French suites or parties by Bach. A sonata by Haydn, Mozart or Beethoven one movement memorized. A work from the Romantic School. A contemporary work. Sight reading.

219-513. Piano

A prelude and fugue from the Well-Tempered Clavier by Bach, a sonata by Haydn, Mozart, or Beethoven, one movement memorized. A work from the Romantic school. A contemporary work. Sight reading.

219-560. Accompanying

Analysis and practice in piano accompaniment of singers and instrumentalists; sight reading and transposition; discussion of style and performance; experience in public performance. May be repeated for credit each semester. Prerequisite. Consent of instructor.

VOICE

219-100. Diction for Singers Credit 1(0-2)

"A course designed to familiarize students with the pronunciation of English, Italian and German language through the study and use of the International Phonetic Alphabet."

219-113. Voice

1) Competencies: Correct posture, breathing habits, phrasing, various five-note scales, diction.

2) Studies: Simple English and Italian art songs, folk songs, spirituals.

3) Solos: Six songs in English and Italian to be memorized each semester. Representative composers: Scarlatti, Handel, Purcell.

219-213. Voice

1) Competencies: Correct posture, breathing habits, phrasing, diction, scales and arpeggios.

2) Studies: English and Italian art songs, German art songs, folk songs, spirituals.

3) Solos: English songs in English, Italian, and German to be memorized each semester. Representative composers: Durante, Scarlatti, Schumann.

219-413. Voice

1) Competencies: Continuation of 213.

2) Studies: English and Italian art songs, German songs, French art songs, folk songs and spirituals.

3) Solos: Nine songs in English, Italian, German, and French to be memorized each semester. Representative composers: Schumann, Schubert, Strauss, Faure, Britten, Mozart.

219-513. Voice

- 1) Competencies: Continuation of 413 with emphasis on preparation for senior recital.
- 2) Studies: Continuation of 413 with more intricate scales and arpeggios.
- 3) Solos: 10 songs in English, German, Italian, and French to be memorized. Representative composers: Wolf, Schumann, Faure, Verdi, Britten, Handel, Debussy.

PERCUSSION

Requirements for Admission — The candidate shall demonstrate satisfactory performing ability in at least one of the following areas of percussion.

Performance — Snare drum, Xylophone, marimba and timpani. These competencies will include:

- 1) The ability to perform a solo.
- 2) The ability to perform an excerpt from a book in which the applicant has studied that will demonstrate musicianship and technical skill.
- 3) The ability to play at sight representative literature which is characteristic of the instrument.
- 4) Previous ensemble in band and/or orchestra. Additional competencies for snare drum:

- a. Basic knowledge of rudiments.
- b. The performance of a Sousa march of the equivalent.

Additional competencies for xylophone marimba: The ability to play major scales through 4 flats and 4 sharps in one octave. Additional competencies for timpani:

- a. Basic knowledge of timpani techniques.
- b. A thorough knowledge of range of each timpano.

219-113, 213. Percussion

- 1) Competencies:
 - a. Snare Drum; Fundamentals, military techniques, reading and control.
 - b. Mallets: Fundamentals, reading technique — musical orientation.
- 2) Studies: Price, Beginning Snare Drum; Goldeberg, Mallet Instruments; Stone, Stack Control; Bower, Drum Method; Gardner, Modern Method, Book I, Stone, Mallet Control.
- 3) Solos: Wilcaxon, Rudimental Solos; Price, Exhibition Drum Solo; Colgrass, Advanced Snare Drum Solo; Brever Easy — Medium Mallet Solos; Stone, Military Drum Beats.

219-413, 513. Percussion

- 1) Competencies:
 - a. Snare Drum; Fine control, orchestra techniques.
 - b. Mallets; Reading, advanced techniques, tambourine, castanets, brass drum, and cymbals.
 - c. Timpani: Kettle technique, tuning exercises and control.
 - d. Latin-American Instruments.
 - e. Percussion, "Trap" techniques, tambourine, castanets, brass drum, and cymbals. Basic skills on each.
- 2) Studies: Price, Techniques and Exercises for Triangle, Tambourine and Castanets; Brewer, Daily Studies; Goldenberg, Mallet Instruments. Goodman, Timpani Method; Fresia, Timpani Method; Tourte, Snare Drum Technique; Gardner, Modern Method, Book II, Mallets; Chopin, Advanced Techniques for the Modern Drummer.
- 3) Solos: McKenzie, Graded Timpani Solos; Britton, Timpani Solo; Hart, Timpani Solos; Price, Unaccompanied Timpani Solos; Brewer, 3 and 4 Mallet Solos, Quick 3 and 4 Mallet Solos; Stone Rudimental Drum Solos; Duets and Quintets.

WIND INSTRUMENTS

Requirements for Admission — The candidate shall show evidence:

- 1) Basic development in embouchure and articulation.
- 2) Knowledge of fingering and alternates.
- 3) Satisfactory tone quality and control.
- 4) Ability to play major scales through 4 flats and 4 sharps, in eight notes (M.M.d-72) and the chromatic scale both slurred and articulated.
- 5) Minimum — Two octave range.
- 6) Ability to play a simple song demonstrating musicianship which includes phrasing and expression.
- 7) Previous study in the equivalent of the Rubank Advanced Method.
- 8) Previous ensemble experience in band and/or orchestra.
- 9) Ability to play at sight representative literature which is characteristic of the instrument.

219-113, 213. Trumpet

- 1) Competencies: Breathing; elementary embouchure and tone production; tonguing as applied to various articulations; coordination of tone production habits through progressive major and minor scales; practical problems of artistic performance.
- 2) Studies: "Studies: Arban's selected studies; selected studies by Getchell, Hovey, Hering and Clarke."
- 3) Literature: Selected from NIMAC — Music Educator's National Conference.

219-413, 513. Trumpet

- 1) Competencies: Intonation; embouchure techniques; breath control and tone quality; articulation; reading; style; performance techniques.
- 2) Studies: Rubank, Advanced Method.
- 3) Literature: Selected from NIMAC — Music Educator's National Conference.

219-113, 214. French Horn

- 1) Competencies: Breathing, embouchure and tone production; tonguing; progressive major and minor scale technique; practical problems of artistic performance.
- 2) Studies: Rubank, Intermediate Method for French Horn; Modern Pares Foundation.
- 3) Studies: Whistler, Daily Exercises for French Horn, Pottag.
- 4) Literature: Selected from NIMAC — Music Educator's National Conference.

219-413, 513. French Horn

- 1) Competencies: Intonation, embouchure techniques, breath control and tone quality; articulations; reading; style; performance techniques.
- 2) Studies: Rubank, Advanced Method for French Horn.
- 3) Literature: Selected from NIMAC — Music Educator's National Conference.

219-113, 213. Trombone-Baritone

- 1) Competencies: Breathing, elementary embouchure and tone production; tonguing as applied to various instruments, coordination of tone production habits through progressive major and minor scales; practical problems of artistic performances.
- 2) Studies: Trombone and Baritone, Arbans-Prescott Method for Trombone-Baritone — Carl Fisher, Inc., Rubank Intermediate Method for Trombone-Baritone. Skornicka and Boltz, Rubank, Rubank, Inc. Modern Pares Foundation. Studies for Trombone and Baritone — Whistler.
- 3) Literature: Selected from NIMAC — Music Educator's National Conference.

219-413, 513. Trombone-Baritone

- 1) Competencies: Intonation, embouchure techniques; breath control and tone quality; articulations; reading; style; performance techniques.
- 2) Studies: Rubank, Advanced Method for Trombone and Baritone.
- 3) Literature: Selected from NIMAC — Music Educator's National Conference.

219-113, 213. Tuba

- 1) Competencies: Breathing, elementary embouchure and tone production; tonguing as applied to various instruments; coordination of tone production habits through progressive major and minor scales; practical problems of artistic performances.
- 2) Studies: Tuba, Rubank Intermediate Method for Brass — Skornicka and Boltz, Rubank, Inc. First Book of Practical Studies for Tuba — Hovey N. Belwin, Inc. Vandercook Etudes for Bass — Rubank, Inc.
- 3) Literature: Selected from NIMAC — Music Educator's National Conference.

219-413, 513. Tuba

- 1) Competencies: Intonation, embouchure techniques, breath control and tone quality; articulation; reading; style; performance techniques.
- 2) Studies: Rubank, Advanced Method for Tuba.
- 3) Literature: Selected from NIMAC — Music Educator's National Conference.

219-113. Flute

- 1) Competencies: Major and minor scales through 5 sharps and 5 flats. Emphasis on fingering and tonal development.
- 2) Studies: Soussmann, Complete Method for Flute; Anderson, 24 Progressive Studies, Op. 33.
- 3) Literature: Bizet, Minuet; Mozart, Adagio; Handel, Sonatas.

219-213. Flute

- 1) Competencies: All Major and Minor scales throughout the practical performing range. Emphasis on sight reading.
- 2) Studies: Cavally, Melodious and Progressive Studies for Flute Soussmann.
- 3) Literature: Bach, Suite in B. Minor; Mozart, concertos.

219-413. Flute

- 1) Competencies: Continued scale study, emphasis on performing literature.
- 2) Studies: Soussman — Moyse, Flute Studies.
- 3) Literature: Bach, Sonatas; Debussy, Syrinx.

219-513. Flute

- 1) Competencies: Continued emphasis on performing literature.
- 2) Studies: Schmitd, Orchestral Studies.
- 3) Literature: Chaminade, Concertino, Hindemith, Sonata.

219-113. Oboe

- 1) Competencies: Major and Minor Scales through 5 sharps and 5 flats. Emphasis on fingering and total development.
- 2) Studies: Ferling, 144 Preludes and Studies; Barrett, Completed Method for Oboe.
- 3) Literature: Franck, Piece V; Piece in G. Minor; Handel, Sonatas.

219-213. Oboe

- 1) Competencies: All Major and Minor Scales throughout the practical performing range. Emphasis on sight reading. Reed adjustment.
- 2) Studies: Barret, Method; Tustin, Technical Studies.
- 3) Literature: Schumann, Three Romances; Telemann, Concerto in F Minor.

219-413. Oboe

- 1) Competencies: Continued scale study, emphasis on performing literature. Reed Making.
- 2) Studies: Tustin, Studies; Prestin.
- 3) Literature: Handel, Sonata in G. Minor, Goosens, Concerto.

219-513. Oboe

- 1) Competencies: Continued emphasis on performing literature.
- 2) Studies: Orchestral Literature.

219-113. Clarinet

- 1) Competencies: Major and Minor Scales through 5 Sharps and 5 flats. Emphasis on fingerings and tonal development.
- 2) Studies: Klose Celebrated Method for Clarinet and Rose 32 Etudes.
- 3) Literature: Stubbins, Recital Literature for the Clarinet, Vol. II.

219-213. Clarinet

- 1) Competencies: All Major and Minor scales throughout the practical performing range. Emphasis on sight reading. Reed adjustment.
- 2) Klose, Rose 40 Etudes.
- 3) Literature: Stubbins, Recital Literature, Vols. I and II.

219-413. Clarinet

- 1) Competencies: Continued scale study, emphasis on performing literature.
- 2) Studies: Baermann, Method for Clarinet; Jean Jean, 18 Etudes de Perfectionnement.
- 3) Literature: Stubbins, Recital Literature, Vol. III (The Concertos)

219-513. Clarinet

- 1) Competencies: Continued emphasis on performing literature.

219-213. Saxophone

- 1) Competencies: All Major and Minor Scales through the practical performing range. Emphasis on sight reading. Reed adjustment.
- 2) Studies: DeVille; Rascher, Top Tones for Saxophone.
- 3) Literature: Bozza, Aria, Casadesus, Romance.

- 2) Studies: Baermann; Jean Jean, Orchestral Studies.
- 3) Literature: Bernstein, Sonata; Debussy, Rapsodie.

219-113. Saxophone

- 1) Competencies: Major and Minor scales through 5 sharps and 5 flats. Emphasis on fingerings and tonal development.
- 2) Studies: DeVille, Universal Method; Ebdressen, Endrejen, Supplementary Studies.
- 3) Literature: Handel, Sonatas.

219-413. Saxophone

- 1) Competencies: Continued scale study, emphasis on performing literature. Introduction to jazz improvising.
- 2) Studies: DeVille; Rascher, 158 Saxophone Exercises.
- 3) Literature: Creston, Sonata; Debussy, Rapsodie; Fasch, Sonata; Music Minus one Saxophone.

219-513. Saxophone

- 1) Competencies: Continued emphasis on performing literature.
- 2) Studies: Traler-Lazarus, Virtuoso Studies.
- 3) Literature: Bozza, Scaramouche.

219-113. Bassoon

- 1) Competencies: Major and Minor scales through 5 sharps and 5 flats. Emphasis on fingerings and tonal development.
- 2) Studies: McDowell, Practical Studies, Book I; Kovar, 24 Daily Exercises; Wessenborn, Practical Method Bassoon.

219-213. Bassoon

- 1) Competencies: All Major and Minor scales throughout the practical playing range. Emphasis on sight reading. Reed adjustment and making.
- 2) Studies: Wessenborn, Method for Bassoon; Kovar, 24 Daily Exercises; McDowell, Practical Studies, Book II.
- 3) Rep. Literature: Telemann, Sonata in F Minor, Weber, Concerto in F (Slow Movement)

219-413. Bassoon

- 1) Competencies: Continued scale study, emphasis on performing literature.
- 2) Studies: Pierne, Concert Piece; Galliard, Sonatas; Mozart, Concerto.

219-513. Bassoon

- 1) Competencies: Continued emphasis on performing literature. Orchestral Studies.
- 2) Studies: Orchestra Passages
- 3) Literature: Hindemith, Sonata.

*Advanced Undergraduate and Graduate***219-609. Music in Early Childhood** **Credit 3(2-2)**

A conceptual approach to the understanding of musical elements; and understanding of the basic activities in music in early childhood; modern trends in music education; Kodaly and Orff methods.

219-610. Music in Elementary School Today **Credit 3(2-2)**

Music in the elementary school curriculum; creating a musical environment in the classroom; child voice in singing, selection and presentation of rote songs; development of rhythmic and melodic expressions; directed listening; experimentation with percussion and simple melodic instruments; criteria for utilization of notational elements; analysis of instrumental materials.

219-611. Music in the Secondary School Today **Credit 3(3-0)**

Techniques of vocal and instrumental music instruction in the junior and senior high schools; the general music class; the organization, administration and supervision of music programs, as well as music in the humanities. This course includes the adolescent's voice and its care; the testing and classification of voices; operetta production; the instrumental program; and training glee clubs, choirs, bands, and instrumental ensembles.

219-614. Choral Conducting of School Music Groups **Credit 2(0-4)**

Rehearsal techniques; balance, blend and relationship of parts to the total ensemble; analysis and interpretation of literature appropriate for use in school at all levels of ability; conducting experience with laboratory group.

219-616. Instrumental Conducting of School Music Groups **Credit 2(0-4)**

Rehearsal techniques; balance blend and relationship of parts to the total ensemble; analysis and interpretation of literature appropriate for use in school groups at all levels of ability; conducting experience with laboratory group.

219-618. Psychology of Music **Credit 3(2-2)**

The study of physical and psychological properties of musical sounds and the responses of the human organism to musical stimuli.

219-620. Advanced Music Appreciation **Credit 3(2-2)**

Analytic studies of larger forms from all branches of music writing; Special emphasis on style and structural procedure by principal composers; works taken from all periods in music history. Designed for students with previous study of music appreciation.

DEPARTMENT OF PHYSICS

Jason Gilchrist, Chairperson

227-101. Introduction to Astronomy* **Credit 3(3-0)**

Fundamentals of astronomy with emphasis on methods of observation and the solar system. Astronomical instruments including optical and radio telescopes. The nature of the sun, moon, planets and other objects of the solar system.

227-102. Physics Orientation **Credit (1-0)**

Lectures, seminars, and laboratory demonstrations. Orientation to the Physics Department. Presentation of selected topics, student participation, and discussions.

227-200. Introductory Physics* **Credit 2(2-0)**

A non-laboratory course involving the study of mechanics, heat, electricity, wave motion, and atomic and nuclear phenomena. Recommended for students with poor high school preparation in physics who should prepare for College Physics or General Physics.

227-201. Survey of Physics **Credit 3(2-2)**

A one-semester study of selected topics in physics including simple machines, heat sound, electricity, and light. Prerequisite: Math 111 or 102.

227-211. Technical Physics I* **Credit 3(4-0)**

A study of basic principles of mechanics, heat, wave motion and sound. Emphasis is placed on applications of physics in modern technology. Prerequisite: Math 111. Corequisite: Math 112, and Physics 216.

227-212. Technical Physics II **Credit 3(4-0)**

A continuation of Physics 211. Magnetism, electricity, light and modern physics. Prerequisite: Physics 211. Corequisite: Physics 217.

227-216. Technical Physics I Laboratory **Credit 1(0-2)**

A qualitative and quantitative study of certain physical systems; critical observations and codification of data are emphasized. Corequisite: Physics 211.

227-217. Technical Physics II Laboratory **Credit 1(0-2)**

A continuation of Physics 216. Corequisite: Physics 212.

- 227-241. General Physics I*** **Credit 4(4-0)**
A study of the fundamental principles of mechanics, heat, electromagnetism, wave motion, sound, light and modern physics. Calculus used. Corequisite: Math 132, Physics 251.
- 227-242. General Physics II*** **Credit 4(4-0)**
A continuation of Physics 221. Prerequisite: Physics 241. Corequisite: Physics 252.
- 227-225. College Physics I*** **Credit 3(3-0)**
A study of the fundamental principles of mechanics, properties of motion, heat and thermometry, electromagnetism, wave motion, sound, light, and modern physics. Calculus is not used, however, a knowledge of analytical geometry is required. Prerequisite: Math 111. Corequisite: Physics 235.
- 227-226. College Physics II** **Credit 3(3-0)**
A continuation of Physics 225. Prerequisite: Physics 225. Corequisite: Physics 236.
- 227-251. General Physics I Laboratory** **Credit 1(0-2)**
Resource material may be provided for self-study and special projects. A selected group of experiments will be performed to verify and demonstrate certain physical phenomena. Corequisite: Physics 221.
- 227-252. General Physics II Laboratory** **Credit 1(0-2)**
A continuation of Physics 231. Corequisite: Physics 222.
- 227-235. College Physics I Laboratory** **Credit 1(0-2)**
A course which will emphasize the importance of experimentation and observations in the development of a physical science. A selected group of experiments will be undertaken. Corequisite: Physics 225.
- 227-236. College Physics II Laboratory** **Credit 1(0-2)**
A continuation of Physics 235. Corequisite: Physics 226.
- 227-400. Physical Mechanics I** **Credit 3(3-0)**
An application of mathematical methods to motion of a particle, damped harmonic oscillator, central field motion, rotating coordinate systems, Fourier series, Lagrange's equations. Vector methods used. Prerequisite: Physics 222. Corequisite: Math 231.
- 227-401. Mathematical Physics** **Credit 3(3-0)**
Applications of mathematics to solution of physical problems. Selected topics in vector analysis, differential equations, special functions, calculus of variations, eigenvalues and functions, matrices. Prerequisite: Math 231.
- 227-402. Thermodynamics** **Credit 3(3-0)**
Includes equations of state, laws of thermodynamics, entropy, fluid flow, heat transfer, single and two-phase mixtures, and statistical mechanics. Prerequisite: Physics 222. Corequisite: Math 231.
- 227-403. Electromagnetism I** **Credit 3(3-0)**
Includes DC and AC circuitry theory, Gauss's Law, Poisson and Laplace equations, dielectric and magnetic materials, Maxwell's equations. Prerequisite: Physics 222, Math 231.
- 227-404. Physical Optics** **Credit 3(3-0)**
Emphasis on wave phenomena. Includes propagation, reflection, refraction of light, lenses and optical instruments, interference, diffraction, polarization, line spectra, thermal radiation. Prerequisite: Physics 222, Math 132.
- 227-405. X-Ray Diffraction** **Credit 3(3-0)**
An introductory course with emphasis on the powder method, including x-ray sources, crystal shapes, and determination of unit cell parameters and atomic positions. Prerequisite: Physics 406 or special permission.
- 227-406. Introduction to Modern Physics** **Credit 3(3-0)**
Quantization of mass, charge, radiation, atomic structure, relativity, theory of solids, natural and artificial radioactivity. Prerequisites: Physics 222 or 226, Math 132.
- 227-408. Solid State Physics** **Credit 3(3-0)**
Structure and imperfections in crystals and metals, energy levels of metals, semi-conductors and their applications, insulators. Prerequisite: Physics 222 and 406.
- 227-410. Introduction to Special Relativity** **Credit 2(2-0)**
A study of the relativistic concepts of space and time. Relativistic kinematic dynamics, and electromagnetic theory. Prerequisite: Physics 406.
- 227-411. Introduction to Astrophysics** **Credit 3(3-0)**
A study of radiation from stars and nebulae to determine the basic stellar characteristics, the composition and physical conditions of matter in and between the stars, and the study of structural properties of our Milky Way galaxy, as evidenced by the spatial distribution of dust, gas, stars and magnetic fields.
- 227-423. Physics Seminar I** **Credit 2**
A study of current developments in physics. Prerequisites: Physics 225 and 226.
- 227-430. Physics Research I** **Credit Variable 1-3**
Involves student participation in research conducted by staff. Prerequisite: Consent of staff.
- 227-431. Physics Research II** **Credit Variable 1-3**
Involves student participation in research conducted by staff. Prerequisite: Consent of staff.
- 227-555. Advanced Laboratory I** **Credit 3(0-6)**
A junior-senior level course with groups of experiments involving vacuum system magnetic resonance, x-ray diffraction, spectroscopy and quantization of charge. Prerequisite: Consent of instructor and Physics 406, 403.
- 227-556. Advanced Laboratory II** **Credit 3(0-6)**
A continuation of Advanced Laboratory I. Prerequisite: Consent of instructor.
- 227-557. Advanced Laboratory III** **Credit 3(0-6)**
A junior-senior level course involving the study and careful performance of a group of experiments in electronic devices as applied to physics. Prerequisite: Junior classification.

227-600. Physical Mechanics II **Credit 3(3-0)**

A continuation of Physics 400. Prerequisites: Physics 400, Math 231.

227-603. Electromagnetism II **Credit 3(3-0)**

Development and applications of the differential forms of Maxwell's equations. Prerequisites: Physics 403, Math 231.

227-604. Electromagnetism III **Credit 3(3-0)**

A continuation of Physics 603. Prerequisite: Physics 603.

227-605 Quantum Mechanics I **Credit 3(3-0)**

Postulates of wave mechanics and Schrodinger equation. Solutions of the Schrodinger equation for the harmonic oscillator, the square well, and the hydrogen atom. Concepts of spin and angular momentum. Approximate solutions of the Schrodinger equation, perturbation theory. Stark and Zeeman effects. Prerequisites: Physics 406 and Math 231.

227-606. Nuclear Physics **Credit 3(3-0)**

Nuclear structure, nuclear interactions, radioactive decay, reactions and cross-sections, nuclear forces, and scattering theory. Prerequisites: Physics 406, and Math 231.

227-615. Quantum Mechanics II **Credit 3(3-0)**

The problem of one and two electron atoms. Hydrogen atom and the alkalis. The hydrogen molecule and the molecular bond. The deuteron problem in nuclear physics. Alpha decay. Scattering theory and the nature of the nuclear force. The motion of a particle in a periodic potential and the role of Quantum Mechanics in solids. Operator formalism. Prerequisite: Physics 605.

DEPARTMENT OF POLITICAL SCIENCE

Amarjit Singh, Chairperson

Undergraduate

237-100. Orientation to Political Science **Credit 2(1-2)**

An introduction to the Department and the major for freshmen and transfer students; administrative organization, faculty specialties, library and other learning resources; scope of the discipline, concentration areas, major, minor and cognate requirements, information concerning graduate schools, law schools, and employment opportunities.

237-200. American Government and Politics **Credit 3(3-0)**

This course introduces the student to the study of politics through an analysis of major features of the American polity. Topics to be treated include the political self-understanding of Americans, the founding of the political system, the operation of our political institutions, and the forms of political participation.

237-210. State and Local Government **Credit 3(3-0)**

A study of the structure and functions of state and local government in the United States and their relationship within the federal system. Special consideration is given to contemporary problems.

237-220. Blacks in the American Political System **Credit 3(3-0)**

This course is designed primarily to facilitate the development of a frame of reference which will make it possible for students to organize and interpret political phenomena involving Black people living in the United States. Special emphasis is placed on understanding the Black predicament in this country, causes and changes.

237-250. Introduction to Public Policy **Credit 3(3-0)**

The course is designed to provide the student with basic knowledge of public policy. Students will survey the approaches and methods of policy studies, contemporary policy issues, and future considerations of public policies.

237-310. Comparative Politics **Credit 3(3-0)**

A survey of the politics and governments of selected political systems highlighting their commonalities and particularities. Special consideration is given to aspects of political development.

237-333. Political Research Methods I **Credit 3(3-0)**

Introduces students to fundamental methods and procedures in the collecting and analyzing of political data. Research on a specific political subject is required.

237-334. Political Research Methods II **Credit 3(3-0)**

A continuation of Political Research Methods I, focussing on data analysis, interpretation and computer utilization.

237-340. Public Administration **Credit 3(3-0)**

Emphasis is devoted to basic principles of organization, location of authority, fiscal management, personnel management forms of administrative action in the public service, technological and managerial advancements.

237-350. Public Personnel Administration **Credit 3(3-0)**

The course focuses on the theory and practice of public personnel administration with emphasis on public personnel selection, training, classification, compensation, promotion and human relations.

237-400. Mass Political Attitudes and Behavior **Credit 3(3-0)**

A study of mass political attitudes and their expression in various forms of political activity. Topics include opinion and democratic theory; social, psychological and institutional influences on political behavior; opinion measurement and mass movements.

237-410. Public Policy and Technology **Credit 3(3-0)**

This course is designed primarily for students in sciences and engineering; however, it does not exclude students in other disciplines, especially, business and economics. Students will study the social, economic, human, and environmental impact of technological development. The role of scientists and technologists in selected policy choices will be examined.

237-420. Public Budgeting **Credit 3(3-0)**

The course deals with the evolution, process, and impact of public budgeting. Special attention is given to the purpose, models, reforms and key factors involved. Budgeting is viewed from the federal, state and local levels.

237-430. Policy Analysis **Credit 3(3-0)**

An introduction to the foundation and methods of policy analysis. Statistical and economic methods are presented with case studies.

- 237-440. Political Theory** Credit 3(3-0)
(Formerly Pol. Sci. 2940)
An in-depth treatment of the growth and development of this area of Political Science and its relevance to the field. The approach considers ancient medieval thought as a unit and modern political thought as a separate unit.
- 237-444. International Relations** Credit 3(3-0)
(Formerly Pol. Sci. 2945)
A comprehensive treatment of the policies and politics of nations; imperialism, colonialism, balance of power, international morality, treaties, sovereignty, diplomacy, tariff, war and other arrangements. Prerequisite: Pol. Sci. 200.
- 237-445. Problems of Contemporary Africa** Credit 3(3-0)
(Formerly Pol. Sci. 2815)
Consideration of liberation struggles, decolonization and the emerging of independent states, and efforts toward Pan-Africanism since World War II.
- 237-448. Politics of Transportation** Credit 3(3-0)
Analysis of political roots of various transportation problems such as highway location issues, mass transit bond issues, and politics of transportation innovation. The working mechanisms of federal, state and local transportation related units will also be considered. Case studies of local, regional and national issues will be included. Prerequisite: Junior status.
- 237-499. Internship I** Credit 3(0-10)
Supervised internship in public and private agencies for political science majors. Prerequisites: Pol. Sci. 200, 210.
- 237-504. Independent Study** Credit 3(3-0)
Senior Political Science majors who have exhibited facility for independent study and attained a minimum grade point average of 3.0 in their major may arrange to investigate an area not covered in the regular curriculum. Permission of the supervising instructor and the Department Chairperson is required.
- 237-505. Honors Seminar in Political Science** Credit 3(3-0)
(Formerly Pol. Sci. 2816)
For superior students (seniors). A thorough examination of selected political works, primarily paperbacks. A treatment of selected political philosophies and ideas for informal discussion. Several critical reviews will be required.
- 237-541. Party Politics and Pressure Groups** Credit 3(3-0)
(Formerly Pol. Sci. 2965)
This course deals with modern political parties in the United States as instruments of popular government. Special emphasis is placed upon party structure, functions and operations as it relates to the Negro. Prerequisite: Pol. Sci. 200.
- 237-542. American Constitutional Law** Credit 3(3-0)
(Formerly Pol. Sci. 2966)
A case study of major Supreme Court Decisions, the Judiciary, the Congress, the President, the Federal System, the First Amendment Freedoms and Due Process Rights.
- 237-543. Civil Liberties** Credit 3(3-0)
A study of major Supreme Court decisions interpreting the Bill of Rights (the First Ten Amendments) and the subsequent amendments dealing with freedom and equality. Ruling of the Warren and Burger Courts will be given special attention. Prerequisite: Advanced Standing (Juniors and Seniors only).
- 237-544. International Organization** Credit 3(3-0)
(Formerly Pol. Sci. 2968)
This course analyzes the role of the international organization in world politics. Particular emphasis is given to the various approaches of international organizations in fostering peace and economic and social cooperation. Some attention will be given to the United Nations system as well as such defense, political, and economic arrangements as NATO, OAS, SEATO and the European Communities.
- 237-599. Internship II** Credit 3(3-0)
This course is designed to expose Political Science majors to the actual environment of political processes, management, and public policy through supervised work experience. Prerequisites: Pol. Sci. 200, 210, 333, 443. (Recommended for summer internship.)
- Advanced Undergraduate and Graduate*
- 237-604. Directed Study/Research** Credit 0(0-6)
Directed study or research on a specific topic in political science.
- 237-640. Federal Government** Credit 3(3-0)
(Formerly Pol. Sci. 2976)
After a brief review of the structure and functions of the federal government, this course concerns itself with special areas of federal government: problems of national defense, the government as a promoter, the government as regulator, etc. Students will engage in in-depth study in one of the specific areas under consideration.
- 237-641. State Government** Credit 3(3-0)
(Formerly Pol. Sci. 2977)
An in-depth study of special problems connected with operations of state and local governments.
- 237-642. Modern Political Theory** Credit 3(3-0)
(Formerly Pol. Sci. 5973)
Includes selected political works for adherence to modern conceptions of the state, political institutions as well as the works of Machiavelli, Hobbes, Spinoza, Rousseau, Burke, Mill, Hegel, Marx, and Dewey.
- 237-643. Urban Politics and Government** Credit 3(3-0)
(Formerly Pol. Sci. 5975)
A detailed analysis of the urban political arena including political machinery, economic forces and political structures of local governmental units.
- 237-644. International Law** Credit 3(3-0)
(Formerly Pol. Sci. 543)
A study of the major principles and practices in the development of the Law of Nations, utilizing significant cases for purposes of clarification. Prerequisites: Pol. Sci. 200, 444.
- 237-645. American Foreign Policy—1945 to present** Credit 3(3-0)
(Formerly Pol. Sci. 2976)
Examination of forces and policies that have emerged from Potsdam, Yalta, and World War II. Emphasis will be on understanding the policies that were formulated, why they were formulated, the consequences of their formulation, and the alternative policies that may have come about. Prerequisites: Survey course in American History, American Diplomatic History, and consent of instructor.

237-646. The Politics of Developing Nations **Credit 3(3-0)**
(Formerly Pol. Sci. 5974)

Political structures and administrative practices of selected countries in Africa, Latin America, Asia, analysis of particular cultural, social and economic variables peculiar to the nations.

237-653. Urban Problems **Credit 3(3-0)**

Analysis of some of the major problems in contemporary urban America. The course includes an examination of their causes, effects and possible solutions.

DEPARTMENT OF PSYCHOLOGY
Emory Sadler, Chairperson

220-242. Information Processing Techniques in Behavioral Research **Credit 3(2-2)**

An exploration of the ability of computers to assist in behavioral research. Included are literature review (bibliographic search), stimulus presentation and response recording (programming and data management), data analysis (spreadsheets and statistical packages), data presentation (graphics), and report writing (word processing). [Fall]

220-320. General Psychology **Credit 3(3-0)**

An introduction to psychology as a life science especially designed for the major in areas other than psychology. Topics given major consideration include maturation and development; motivation, emotion, and personality; mental health, intelligence and aptitude; perception and attention; learning, forgetting, language, and thinking; social influence, attitudes, and beliefs, and vocational adjustment.

220-321. Elementary Psychology **Credit 3(3-0)**

An introduction to psychology as a behavioral science required of the major in psychology with enrollment restricted to such majors. Majors areas of consideration include maturation and development, nervous system and internal environment; physiological basis of behavior; motivation, emotion, and personality; and psychological testing.

220-322. Statistical Methods **Credit 4(3-2)**

Analysis and interpretation of research data. Descriptive statistics (frequency distributions, centrality, variability, and correlation of measures), introduction to statistical inferences (normal curve sampling theory, chi square tests of statistical hypotheses, t-tests, analysis of variance). Prerequisite: Psy. 242 (or permission of instructor).

220-324. Developmental Psychology I **Credit 3(3-0)**

A comprehensive study of the physical, social, emotional, personality, language, and intellectual development of the child from birth through early childhood.

220-325. Developmental Psychology II **Credit 3(3-0)**

A continuation of Developmental Psychology I with emphasis on the periods of middle childhood through adolescence.

220-326. Developmental Psychology III **Credit 3(3-0)**

A study of those psychological processes of development occurring from the end of the period of adolescence and extending through the remaining life span, thus including early, middle, and late adulthood and senescence or old age. Considerations will be given to physical, cognitive, and social aspects, sex, personality traits, change of lives, retirement, and the process of aging.

220-420. Social Psychology **Credit 3(3-0)**

An introduction to the study of the behavior of the individual in relation to factors in his social environment. Socialization, enculturation, attitude formation and modification, social influence on perceptual and conceptual processes, and social interaction.

220-434. Abnormal Psychology **Credit 3(3-0)**

Behavior deviations and psychological disorders occurring during the several developmental stages; basic concepts employed in psycho-pathology, mental hygiene, and psychiatry.

220-439. Theories of Personality **Credit 3(3-0)**

Contemporary theoretical formulations of the structure and development of personality and their empirical bases.

220-440. Introduction to Psychological Research **Credit 4(3-2)**

A survey of various research methods with an emphasis on experimental design, instrumentation, and the collection, analysis, interpretation, and reporting of research data. Prerequisite: Psy. 322 or equivalent.

220-445. Industrial Psychology **Credit 3(2-2)**

A consideration of the significance of individual difference in industry; employee selection and training; reduction of monotony and fatigue and the promotion of efficiency; accident prevention; psychological factors in employee turnovers.

220-500. Independent Study **Credit 3-**

Independent study on a specific topic or area in behavioral science. Prerequisite: Permission of the instructor.

220-540. Physiological Psychology **Credit 3(2-2)**

A study of the physiological and chemical processes (and their anatomical substrates) that intervene between the arrival of sensory impulses in the central nervous system and the elaboration of responses to them. Prerequisite: Zoology 461.

220-541. Human Learning and Cognition **Credit 3(3-0)**

An exploration of general principles of learning and memory along with their practical applications. Coverage will include simple (conditioning) to complex (thinking and problem solving) aspects of human behavior and cognitive activity with data and interpretations from several points of view presented.

220-542. Seminar in Psychology **Credit 3(3-0)**

A study of selected major systematic views and theoretical issues in psychology. Each student participates in supervising research in psychological journals and other materials leading to an oral presentation and written paper on a substantive view or issue in psychology.

220-544. Psychological Testing **Credit 3(2-2)**

Emphasizes the principles of measurement of psychological attributes; an examination of factors essential for a reliable and valid measuring instrument with an emphasis on the important role they play in producing their effects. There will be discussion and preclinical experiences with the more valid tests available in the areas of personality; aptitude, attitude, interest and intelligence testing. Prerequisite: Psy. 322.

220-545. History and System in Psychology **Credit 3(3-0)**

A survey of the philosophical and scientific origins of contemporary theories of behavior including consideration of the schools and systems of thought which have emerged.

220-644. Applied Psychology **Credit 3(3-0)**

The utilization of psychology concerning the diagnosis, treatment, and prevention of physical disorder (e.g. hypertension) and disease from a behavioral and/or psychological perspective. Prerequisite: junior or senior standing or permission of the instructor (Fall).

220-550. Animal Behavior **Credit 3(3-0)**

A study of various types of animal behaviors such as communication, aggression, feeding, sexual behavior, maternal behavior, territoriality, socialization, learning processes, and responses to stressors, and how heredity and environment affect these behaviors, with emphasis on domestic animals and their often "unnatural" environment. (Prerequisite: at least junior standing).

220-645. Behavior Modification **Credit 3(3-0)**

A survey of relevant research and techniques making use of either learning theory or behavior principles in the treatment of deviant behavior. Special emphasis is placed on the use of operant conditioning procedures in the prevention and treatment of abnormal behavior.

DEPARTMENT OF SOCIOLOGY AND SOCIAL WORK
Sarah Kirk, Chairperson
Office: 201 Gibbs Hall

SOCIOLOGY

235-100. Principles of Sociology **Credit 3(3-0)**

Basic concepts and principles in Sociology as they are used to examine patterned and recurrent forms of social behavior.

235-S101. Basic Quantitative Writing and Computer Skills in Sociology **Credit 3(3-0)**

This course, to be taken concurrently with S100 — Principles of Sociology, is designed to provide students with basic computer skills needed to summarize and describe sociological data. The ability to perform elementary calculations, such as percentages, proportions, and ratios, along with utilization of graphing techniques is a prime objective. Other descriptive/summary statistical techniques emphasized include construction and interpretation of one- and two-variable tables. A third objective is to ensure that students can write a clear report in standard English on the methods and findings of elementary research.

235-204. Social Problems **Credit 3(3-0)**

Major social problems in American society and their relationship to social structures. Prerequisite: Soc. 100, concurrent, Statistics.

235-301. Origins of Social Thought **Credit 3(3-0)**

Review of the major historical sources, nature and growth of social thought. An introduction to the emergence of Sociological Theory in Europe and America in the 19th and early 20th centuries.

235-302. Social Statistics I **Credit 3(3-2)**

An introduction to elementary statistical reasoning. Prerequisite or concurrent: Soc. 100.

235-303. Social Research Methods I. **Credit 3**

Introduction course in social research methods; basic theory, principles and practical applications of data collection, analysis and interpretation. Includes study of research designs, measurement techniques, and sampling techniques used in survey research methods.

235-304. Social Aspects of Human Sexuality **Credit 2(2-0)**

Social aspects of human sexuality. American sexual behavior and its influence on life styles. Emphasis will be on social roles.

235-305. Reading for Honors in Sociology **Credit 3(3-0)**

Intensive and extensive library research on topics in Sociology. Prerequisite: "B" average.

235-308. The Family **Credit 3(3-0)**

The family as a social institution, and family types in cross cultural perspective.

235-312. Major Problems of Family Functioning **Credit 3(3-0)**

This course examines the dynamics of families experiencing major dysfunctions related to poverty, violence, the effects of deviant family members, and the social programs and policies relating to these problem areas. This course will enhance the student's social work practice with families by increasing understanding of dysfunctional effects of these problems on the family system and its individual members and the relationship of policies and programs to the enhancement or deterioration of family life. Prerequisite: Soc. 308.

235-313. The Community **Credit 3(3-0)**

A study of the social areas commonly defined as communities, and analyses of the social processes that occur within their boundaries.

235-323. Introduction to Family Therapy **Credit 3(3-0)**

Designed to introduce the student to the rapidly developing field of family therapy. A brief overview of family therapy will be presented, along with explanation of the similarities and the difference with other therapies. Several models of practices and technique will be presented. Prerequisite: Soc. 308, Soc. 312, Soc. Serv. 334.

235-402. Social Theories **Credit 3(3-0)**

Social thought and theory in its development from Comte to the present. Prerequisite: Soc. 302.

235-403. Social Research Method I. **Credit 3**

Introductory course in social research methods; basic theory, principles and practical applications of data collection, analysis and interpretation. Includes study of research designs, measurement techniques, and sampling techniques used in survey research methods.

235-406. Criminology **Credit 3(3-0)**

Genesis and origin of crime and an analysis of theories of criminal behavior. Prerequisite: Six (6) hours of Soc. and/or Soc. Serv.

235-408. Independent Study I **Credit 3(3-9)**

Independent research on a specific topic or a delineated area in Sociology. Prerequisite: Permission of the instructor. (May be used in place of Soc. 403.)

235-501. Social Stratification **Credit 3(3-0)**

A study of social inequalities and differentiation as related to social structures and social systems. Prerequisite: Soc. 302.

235-503. Juvenile Delinquency **Credit 3(3-0)**

Sociological and psychological explanation relative to the causes and rehabilitation of juvenile delinquents, probation and treatment of juveniles within the criminal justice system. Prerequisite: Soc. 100.

235-671. Research Methods II Credit 3(3-0)

Continuation of Soc. 403. Prerequisite: Senior or graduate standing; minimum of 6 to 9 credits in statistics and research.

235-672. Selected Issues in Sociology Credit 3(3-0)

Topics of current interest to sociologists and the student body are explored.

235-673. Introduction to Population Studies Credit 3

Overview of demographic processes; growth, fertility, mortality and migration in human populations. Focus on causes and consequences of demographic change in relation to social change and economic development.

235-674. Evaluation of Social Programs Credit 3

Main focus on evaluative research methodology; research designs, measurement of program effectiveness and cost-effectiveness analysis. Includes case studies of needs assessment, program monitoring and impact measurement in human services. Prerequisite: Social Statistic (S302) and Research Methods (S403).

SOCIAL WORK

235-133. Social Professions, Fields and Services Credit 3(2-2)

Course is designed to introduce students to the human services professions with emphasis on Social Work as a profession. It explores the human service professions from historical, sociological, political, and economic viewpoints.

235-210. Professional Relationship Skills Credit 3(3-0)

This course is designed to provide the student with an understanding of the effective dimensions present in the helping process and an opportunity to learn and practice the skills. The course will be helpful to students entering social work, guidance and counseling, teaching, and nursing. It should be taken prior to field placement for B.S.W. students. Prerequisite: Soc. Serv. 133 or consent of the instructor.

235-306. Social Functioning and Human Development Credit 3(3-0)

Covers social growth during the life cycle, aspects of communication between people from different cultural backgrounds, and the implications of this growth and communication for service delivery to members of ethnic groups.

235-307. Field Instruction I Credit 5(0-6)

The first of two practicums in generalist principles and concepts in a human service agency is provided. Agency field instructors carry responsibility for facilitating students' learning. This is accomplished via personal supervision designed to help students integrate theory and practice to develop appropriate skill, knowledge, attitude and professional identity. Taken concurrently with Soc. 334. Students in both semesters spend two days a week in the field agency usually on Tuesdays and Thursdays. These are two field work days.

235-309. Disability and Employment Credit 3(3-0)

This course will focus on selected mental, physical, and social disabilities, and their implications for coping and employment.

235-318. Practicum in the Community Credit 5(0-16)

Selection of a community problem; study and analysis of the problem followed by corrective activities, when possible. Prerequisite: Consent of the instructor.

235-320. Reading for Honors in Social Welfare Credit 3(3-0)

Extensive library research in selected areas of social welfare. Prerequisite: Sophomore standing, "B" average.

235-325. Honors Seminar in Social Service Credit 3(3-0)

Selected topics in social welfare are extensively studied and discussed. Prerequisite: Junior standing, "B" average.

235-333. Social Welfare Credit 3(3-0)

Social Welfare legislation and policy. Prerequisite: Soc. Serv. 133.

235-334. Social Work Methods I Credit 3

An introduction to the principles of social work practice and to the multiple roles assumed by the generalist social worker. Emphasis is placed on developing basic skills required for effective intervention with individuals, families and small groups. Course content provides for the analysis of interviewing, problem assessment and strategies through experiential exercises. Taken concurrently with Soc. 307. Students are also required to participate in a seminar course which meets twice a month usually on Wednesday mornings. This seminar is a part of the field instruction program and is designed to help students integrate their learning experiences.

235-372. Child Welfare I Credit 3(3-0)

This course is designed to offer students an opportunity to develop cognitive skills as they relate to the history and development of Child Welfare. Students will review needs of children and evaluate the extent to which parents/society are able to meet their needs.

235-373. Child Welfare II Credit 3(3-0)

An examination of philosophies and institutional systems that impact on child welfare. This course will examine influences of such issues as racism, sexism, women's lib, and child advocacy. Major institutions (educational, court/legal, health care, economic, political) will be examined to identify and evaluate effects. Prerequisite: None.

235-374. Institutional Services for Children Credit 3(3-0)

A study of the primary resources available for children. Emphasis will be placed on the characteristics of children needing help and the adequacy/inadequacy of community programs. Attention is given to the cooperative nature of these programs as well as the auspices, standards and policies. Prerequisite: None.

235-520. Field Instruction II Credit 5

A continuation of knowledge and skill development under the guidance of the agency field director. Students are expected to gradually perform more independently often assuming full responsibility for various agency tasks assigned to them. Taken concurrently with Soc. 571.

235-525. Independent Study Credit 3(0-9)

Independent research in a delineated area of social welfare. Prerequisite: Consent of the instructor.

235-571. Social Work Methods II Credit 3(3-0)

A continuation of skill development. Emphasis is on social work intervention in larger organizations, groups and communities. Attention is given to further understanding the dynamic relationship between people and their environments, the conflicting issues in social work practice, and the impact of various settings on practice. Taken concurrently with Soc. 520.

**Full time social work students are required to register for Soc. Work 306, 307, 333, and 334 concurrently. Part time students with faculty approval may complete Soc. Ser. 306, and 333 prior to registering for 307 and 334.*

ANTHROPOLOGY

235-200. Introduction to Anthropology Credit 3(3-0)

An analysis and comparison of primitive cultures; further comparisons with modern cultures.

235-300. Topics in Cultural Anthropology Credit 3(3-0)

Selected topics in language, culture, mythology, and religion designed to acquaint students with analyzing cultural patterning in this and other cultures.

235-420. Human Evolution in Ecological Perspective Credit 3(3-0)

Examines human cultural and biological evolution using an ecological perspective.

235-603. Introduction to Folklore Credit 3(3-0)

Basic introduction to the study and appreciation of folklore.

235-650. Independent Study in Anthropology Credit 3(3-0)

Enables the student to do readings and research in anthropology in cooperation with the instructor.

235-651. Anthropological Experience Credit 3(2-2)

An exploration of anthropological theories and research methods with an emphasis on qualitative research methods.

INTRA-DEPARTMENTAL COURSES

235-310. Medical Sociology Credit 3(3-0)

Sociological analysis of medical services, the role of the sick; professional organizations and quasi professional groups; social-izational structure of hospitals; sociodemographic and socio-epidemiologic variables in relation to modern societies. Cultural and cross-cultural customs and traditions affecting attitudes toward health and the healing art. Prerequisite: Soc. 100.

235-311. Sociology of Mental Health Credit 3(3-0)

Socio-cultural variation in the assessment of sociopathological and psychopathological aspects of mental disorder. A critical analysis of institutions of mental health care, consideration of the etiology of mental illness, typologies, and social policies relative to the phenomenon of mental health. Prerequisite: Soc. 100.

235-314. Black Experience Credit 2(2-0)

A topical seminar focusing on commonly shared experiences of American Blacks in selected social institutions. Prerequisite: Junior standing.

235-370. Aging in Society Credit 3(3-0)

Aging and its implication in social institutions. Prerequisite: Junior standing.

235-515. Independent Study II Credit 3(0-9)

Prerequisite: Six (6) hours of statistics, and/or research.

235-570. Senior Seminar Credit 1(1-0)

Research and discussion of professional, and field issues related to careers in Sociology and in Social Service. Prerequisite: Senior standing.

235-600. Seminar in Social Planning Credit 3(3-0)

Personal and social values as related to social planning; "systems" theories program planning and evaluation. Prerequisite: Senior or graduate standing.

235-601. Seminar in Urban Studies Credit 3(3-0)

An analysis of the nature and problems of cities, urban society and urban development.

235-625. Sociology/Social Service Internship Credit 5(0-5)

An internship to provide opportunities for students to enhance their employability by supervised experiences in selected agencies.

235-669. Small Groups Credit 3(3-0)

Elements and characteristics of small group behavior and process. Prerequisite: Senior or graduate standing; permission of the instructor.

235-670. Law and Society Credit 3(3-0)

This course examines selected and representative forms of social justice and injustices; barriers to and opportunities for legal redress, as related to contemporary issues. Prerequisite: Senior or graduate standing.

Note:

Sociology 100; Sociology 101, Sociology 204 and Introduction to Anthropology 200 are the only courses scheduled to be taught each semester, in order to fulfil General Education requirements. Other courses are taught once per year and students *must* follow the curriculum sheet.

DEPARTMENT OF SPEECH COMMUNICATION AND THEATRE ARTS

Mary M. Tuggle, Chairperson

SPEECH

215-116. Voice and Diction Lab I Credit 1(0-2) (Formerly Speech 216)

A course in speech improvement. Emphasis on articulation, pronunciation and projection.

215-117. Voice and Diction Lab II Credit 1(0-2)

Continuation of Speech 116. Work under critical scrutiny to improve articulation, pronunciation and voice quality.

215-118. Development of General American Speech Patterns Credit 1(0-2)

Topics include the development of General American speech patterns, the role and value of dialects, and the social functions of language.

215-119. Speech Improvement for Foreign Students Credit 1(0-2)

Instruction and practice in the development of speech intelligibility. For foreign students who wish to increase the intelligibility of their spoken American English.

- 215-250. Speech Fundamentals** **Credit 3(3-0)**
Introduction to the rhetorical, psychological, physiological, linguistic, and communication bases of oral disclosure. Preparation and practice in intrapersonal, interpersonal and public communication, and critical listening. Speech 116 is a recommended prerequisite for students with nonstandard speech and voice patterns.
- 215-251. Public Speaking*** **Credit 3(3-0)**
A study of the methods by which public speeches are made clear, interesting and forceful; practice in writing and delivering speeches according to the audience and occasion. Prerequisite: Speech 250.
- 215-252. Argumentation and Debate*** **Credit 3(3-0)**
Study and practice in analysis, gathering of material, briefing, ordering of arguments and evidence, refutation, and delivery. Prerequisite: Speech 250.
- 215-253. Parliamentary Procedures*** **Credit 2(2-0)**
Theory and practice in the rules and customs governing the organization and proceedings of deliberative bodies. Prerequisite: Speech 250.
- 215-335. Rhetoric of American Thought** **Credit 3(3-0)**
A critical study of selected American orators — their speech making on controversial social and political issues from 1830-1960, as well as the impact upon their audiences. Black American orators included. Prerequisite: Speech 250.
- 215-340. Phonetics** **Credit 3(3-0)**
Broad transcription: The International Phonetic Alphabet; Standards of pronunciation; dialectal variations in America; physiological and acoustical bases of speech sounds. Prerequisite: Speech 250 or consent of the instructor.
- 215-380. Introduction to Speech Pathology** **Credit 3(3-0)**
A study of the causes, symptoms, and treatment of minor speech disorders, basic theories underlying speech correction. Aimed at preparing the classroom teacher to identify common speech disorders and to make referrals to speech therapists.
- 215-404. Voice and Articulation Disorders** **Credit 3(3-0)**
Consideration of theories, principles, and procedures for appraisal and treatment of voice and articulatory deviations. Prerequisite: Speech 380.
- 215-407. Introduction to Audiology** **Credit 3(3-0)**
A study of hearing, both normal and abnormal, with information on the nature, causes, identification and rehabilitation treatment of persons with hearing disorders. Prerequisite: Advanced standing.
- 215-415. Anatomy and Physiology of the Ear and Vocal Mechanism** **Credit 3(3-0)**
A study of the organs and systems of the body related to the processes of hearing and speech. Prerequisite: Juniors and seniors or consent of the instructor.
- 215-420. Group Discussion** **Credit 3(3-0)**
A study of the forms of discussion and the principles and methods underlying them. Practice in leading and participating in discussion situations. Prerequisite: Speech 250.
- 215-421. Oral Reading and Interpretation** **Credit 3(3-0)**
A study of the analysis and the oral interpretation, of the forms of classical and modern literature, e.g. poetry, narrative prose, the essay, and dramatic literature. Oral practice in individual and group projects.
- 215-425. Principles of Audiometry** **Credit 3(3-0)**
A study of the techniques of hearing assessment in clinical, educational, industrial, and medical settings; interpretation of test results. Prerequisite: Successful completion of Speech 407 and 415.
- 215-430. Development of Speech and Language in Children** **Credit 3(3-0)**
The growth of speech and language in children; theories of speech and language development. Prerequisite: Successful completion of Speech 380.
- 215-431. Organic Disorders** **Credit 3(3-0)**
A study of theories, principles and procedures for appraisals and treatment of deviant voice and articulation that accompany cerebral palsy, cleft palate, maxillofacial injuries, and other physical anomalies. Prerequisite: Speech 380, 404.
- 215-450. Aural Rehabilitation** **Credit 3(3-0)**
A study of the major theories of speech reading and procedures for teaching visual communication skills to hearing-impaired persons. Prerequisite: Speech 407, 425, and 340.
- 215-460. National and International Broadcasting** **Credit 3(3-0)**
Analysis of systems of radio and television broadcasting in various countries, including development, programming philosophies, methods of financing, technical standards and cross-cultural relationship. Prerequisite: Junior or Senior standing.
- 215-510. Introduction to Stuttering** **Credit 3(3-0)**
A study of theories, principles and procedures for the appraisal and treatment of persons with dysfluencies of speech. Prerequisite: Speech 380.
- 215-539. Methods of Teaching Speech and Theatre** **Credit 3(3-0)**
A study of the aims, objectives, problems and difficulties experienced in teaching speech in the modern school. Special attention is given to the organization and coordinator of both speech and theatre curriculums, to planning courses of study, its presentation, and to the selection of materials and equipment required of all Speech and Theatre Education majors. Prerequisites: 27 hours of Speech and 15 hours of Education and Psychology.
- 215-550. Clinical Practicum I** **Credit 3(3-0)**
Supervised clinical experiences in the management of speech language and/or hearing disorders; includes interviews, diagnosing and formulating and carrying out a plan of therapy. Prerequisites: Successful completion of 12 hours of Speech Pathology and Audiology courses and consent of Clinical Supervisor.
- 215-551. Clinical Practicum II** **Credit 3(3-0)**
A continuation of Speech 550. Prerequisite: Speech 550.
- 215-633. Speech for Teachers** **Credit 2(2-0)**
Study and application of the fundamental principles of oral communication related to teaching and learning; speech activities and interpersonal relations identified with teaching and learning and the teaching profession; exercises for self-improvement in the various speech processes.

*Students are required to purchase supplemental materials for this course.

- 215-636. Persuasive Communication** Credit 3(3-0)
A study of the theory and practice of persuasive speaking in the democratic society, including formal and informal persuasive speaking, types of proof, and the ethics of persuasion. Practice in the preparation and presentation of persuasive messages.

COMMUNICATIONS

- 215-131. Practicum I** Credit 1(0-2)
Student serves on staff of campus newspaper, TV studio, radio station, theatre or in a public relations capacity in a University Office. May be repeated once.

- 215-150. Grammar Lab for Communicators** Credit 1(0-2)
Instruction in journalistic style writing with emphasis on principles of spelling, sentence structure, grammar, diction and usage. Must pass departmental competency examination.

- 215-202. Introduction to Mass Media** Credit 3(3-0)
Survey of mass media, including newspapers, magazines, radio and television. Prerequisite: Communications 150.

- 215-220. News Writing (Formerly English 225)** Credit 3(2-2)
Study of elements of news stories, writing of leads, organization and writing of various types of news stories for newspapers, radio and television. Prerequisites: Communications 150 and ability to type and use computer terminals.

- 215-230. Public Affairs Reporting (formerly English 231)** Credit 3(3-0)
Consists of advanced training in specialized reporting. Extensive practice in reporting news and governmental and legislative agencies. Prerequisite: Communication 220.

- 215-231. Practicum II** Credit 1(0-2)
Student serves on staff of campus newspaper; TV studio, radio station, theatre or in public relations capacity in a University Office. may be repeated once. Prerequisite: Communications 131.

- 215-302. Minorities in Mass Media (Formerly Speech 260)** Credit 3(3-0)
An overview of past and present minority contributions in the areas of major motion pictures, radio, television newspaper and magazine. This course will also present a close look at minority roles in contemporary media development, with emphasis on possible career opportunities for minorities.

- 215-303. Television Production I (Formerly Speech 256)** Credit 3(2-2)
Methods and techniques in television production, directing and announcing; program design, lighting, audio, camera, and electronic techniques. Lab. practice. Prerequisites: Speech 116 and Communications 345.

- 215-304. Radio Production I (Formerly Speech 255)** Credit 3(2-2)
Practical experience in radio broadcasting techniques and conventional studio practices; projects in radio announcing. Programs are planned and executed by the students. Prerequisites: Speech 116 and Communications 345.

- 215-312. Survey of Visual Styles** Credit 2(2-0)
An introduction to the study of basic visual techniques and styles utilized in theatrical films and television productions.

- 215-313. Video Editing** Credit 3(3-0)
Instruction and practice in methods of video editing. Prerequisites: Communications 303 and 304.

- 215-320. News Editing and Layout (Formerly English 230)** Credit 3(3-0)
A continuation of Communication 230, with primary emphasis on basic copyediting. Extensive practical work copyediting, headline writing, principles of typography and makeup. Weekly outside news and feature assignments constitute the laboratory period. Prerequisite: Communications 230.

- 215-325. Broadcast News Writing** Credit 3(3-0)
Analysis of broadcast journalism; reporting, writing and editing of news for radio and television in oral and visual modes. Prerequisite: Communications 220.

- 215-330. Reporting Techniques for Print Media** Credit 3(3-0)
Exercises in news gathering, interviewing, and writing news for print media. Prerequisite: Communications 230.

- 215-331. Practicum III** Credit 1(0-2)
Student serves on staff of campus newspaper, TV studio, radio station, theatre or in a public relations capacity in a University Office.

- 215-335. Reporting Tech. for Broadcast Media** Credit 3(3-0)
Exercises in news gathering, interviewing, and writing news for broadcast media. Prerequisite: Communications 325.

- 215-340. Feature Writing (Formerly English 330)** Credit 3(3-0)
An intensive practicum of feature writing involving background research for an in-depth report of various topics. Prerequisites: Communications 220, 230.

- 215-345. Writing for Radio and Television** Credit 3(3-0)
A survey course to introduce the fundamentals of writing non-fiction and non-dramatic broadcast material which includes public service announcements, informational copy, talk shows, music continuity; plus standard and specialized formats. Students are required to demonstrate an understanding of these fundamentals by completing a variety of practical writing assignments. Prerequisite: Communications 325.

- 215-376. Public Information & Public Relations Techniques (Formerly English 464)** Credit 3(3-0)
Publicity and promotion methods are employed by educational institutions, federal agencies and private industries; how to communicate through newspapers, magazines, radio-television stations and other media. Prerequisites: Communications 230 and 345.

- 215-386. Advanced Public Relations** Credit 3(3-0)
Instruction in planning, developing, and evaluating aspects of internal and external communications programs. Budgeting, audience and media selection, special events and public relations campaigns. Prerequisite: Communications 376.

215-392. Communications Law and Ethics Credit 3(3-0)

Survey of legal and extra-legal limitations on press freedom. Study of legal issues including libel, free press-fair trial, contempt of court, copyright, access law. Prerequisite: Junior standing.

215-402. Current Issues in Mass Communications (Formerly English 462) Credit 2(2-0)

A study of the rights, responsibilities and changing characteristics of the mass media and the problems therein. Extensive use of mass communications practitioners and guest speakers, and field trips. Prerequisite: Communications 392.

215-403. Television Production II (Formerly Speech 351) Credit 3(2-2)

Additional practice in the theories and methods of producing, writing, and directing various types of television productions. Laboratory practice. Prerequisite: Communications 303.

215-404. Radio Production II (Formerly Speech 350) Credit 3(2-2)

Broadcast announcing styles. It will include preparation for acquiring the FCC Restrictive Operators Permit. Prerequisite: Communications 304.

215-413. Advanced Video Production Credit 3(3-0)

Refined video production techniques are developed through the creation of individual video programs. Prerequisite: Communications 313.

215-414. Audio Production Credit 3(3-0)

Practical application of announcing, production and editing techniques are developed through the creative production of audio tapes for narrations, public service and commercial announcements and programs. Prerequisites: Communications 303 and 304.

215-423. Field Production Credit 3(3-0)

Practical application of out-of-studio production techniques and theories for audio and video programs. Prerequisite: Communications 313.

215-431. Practicum IV Credit (10-2)

Student serves on staff of campus newspaper, TV studio, radio station, theatre or in public relations capacity in a University Office.

215-440. Editorial Writing (Formerly English 333) Credit 3(3-0)

A study of interpretation and comment and practical experiences in the writing of various types of editorials. Students make a practical analysis of various editorials.

215-486. Print and Radio/TV Advertising (Formerly English 334) Credit 3(3-0)

This course will concentrate primarily on the writing of advertising copy for newspapers, magazines, direct mail and radio; and writing of storyboard commercials for television. A detailed study of how to gather, synthesize and assemble data for an advertisement will be covered. Promotional concepts of advertising will be given some treatment. Advertising art work will not be emphasized in detail. Prerequisite: Communications 386.

215-492. Cable Television Seminar (Formerly Speech 491) Credit 3(3-0)

Review of the development of cable-television in the U.S., including the law governing it, technical facilities necessary for an operation, methods of financing type of programming content. The course will also focus on the advantages and disadvantages of minorities in programming. Prerequisites: Communications 392, 422.

215-496. Publications Design and Layout Credit 3(3-0)

Learning the principles of publications design and layout with actual practice on the campus laboratory publication. With lab. Prerequisite: Communications 376.

THEATRE

215-201. Drama Appreciation Credit 3(3-0)

Appreciation of theatre as an art; survey of the contribution of the playwright, actor, director and designer to the dramatic literature.

215-204. Theatre Movement II Credit 2(0-4)

This course is designed to develop an awareness of expressive artistic movement. Specific topics will include: Alexander techniques, theatre movement, mime, and pantomime, jazz dance, and physical conditioning. Prerequisite: Theatre 203.

215-302. Elements of Play Production Credit 3(2-2)

Study of basic principles in all aspects of production and application of these principles to particular situations; affords opportunities for practical experience in acting, directing, lighting, scenery design, and construction. Prerequisite: Speech 250.

215-303. Acting I (Formerly Theatre 301) Credit 3(3-0)

This is designed to emphasize the ability of the beginning actor to the fundamentals and techniques of acting.

215-304. Studio Acting I Credit 2(0-4)

Continuation of Theatre Laboratory I with concentration on scene study from the modern repertoire. Prerequisite: Theatre 303.

215-203. Theatre Movement I Credit 2(1-2)

Bodily movement, rhythmic and fencing to train the body for effective stage mechanics and versatility.

215-403. Acting II (Formerly Theatre 654) Credit 3(3-0)

Creative techniques in scene study from representative plays of the past and present. Special emphasis will be given to auditioning professionally.

215-404. Studio Acting II Credit 1(0-2)

Exploration of the special demands of auditioning with period styles and speaking verse. Emphasis upon Greek and Shakespearean drama. Prerequisite: Theater 403.

215-405. Improvisational Theatre 2(1-2)

The student is encouraged to examine the means by which he becomes an actor, through improvisation, scene study and finally improvising a play.

- 215-440. Play Directing** Credit 3(3-0)
Elementary principles of staging plays; practical work in the directing of the one-act play; attention is given to the principles of selecting, casting, and rehearsing of plays. Exercises, lectures, and demonstrations. Prerequisite: Theatre 302, 303.
- 215-441. Stagecraft** Credit 3(3-0)
Study of principles of scenery construction and painting; practice in mounting productions for major show. Prerequisite: Theatre 302.
- 215-442. Stage Lighting** Credit 3(2-2)
(Formerly Theatre 655)
A beginning course in stage lighting that emphasizes the practical aspects of lighting a production. Students learn through exposure to and working with, the variety of equipment available to meet the lighting demands of any play. In addition, there are discussions of electricity design, color and special effects. Prerequisite: Theatre 302.
- 215-443. Scene Design** Credit 3(1-4)
A course in perspective, dealing with the representation of common objects, interiors, buildings, and landscapes as they appear to the eye. One hour lecture and two hours laboratory each week. Prerequisite: Theatre 441.
- 215-444. Stage Management** Credit 3(3-0)
Techniques and conventions commonly used for staging the production, planning, rehearsals, co-ordinating, technical requirements and professional standards per Actor's Equity Association Rule Book. Class and lecture.
- 215-457. Essentials of Playwriting** Credit 3(3-0)
Emphasis on creative work and class criticism; structure, characterization and dialogue are studied with reference to standard plays. Prerequisite: Consent of the instructor.
- 215-500. History of the Theatre I** Credit 3(3-0)
A study of theatre architecture, scenery, costume, methods of staging and production in Europe as well as a study of representative playwrights from Ancient Greece to Russia. Prerequisite: Theatre 302 or consent of the instructor.
- 215-501. History of the Theatre II** Credit 3(3-0)
A continuation of Theatre I beginning with Realism, Naturalism, Symbolism, Expressionism, and neo-Romanticism in Theatre down to the Avant-Garde Theatre in Europe. Prerequisite: Theatre 302 or consent of the instructor.
- 215-503. Acting III** Credit 3(3-0)
(Formerly Theatre 666)
This course is designed to emphasize the styles of acting in Greek, Shakespearean, Restoration plays as well as Commedia dell'arte.
- 215-504. Studio Acting III** Credit 2(0-4)
Continuation of Acting III with emphasis upon special acting of commedia dell'arte comedy of manners and farce. Prerequisite: Theatre 503.
- 215-620. Creative Dramatics** Credit 3(3-0)
Theory and function of creative dramatics and applications in elementary education; demonstrations with children; special problems for graduate students. Prerequisite: Senior level standing or consent of instructor.
- 215-630. Black American Drama** Credit 3(3-0)
A study of significant developments in the American Black Theatre since 1900 as reflected through the major playwrights and theatre organizations.
- 215-631. Modern American Drama and Theatre since 1900** Credit 3(3-0)
A study of significant developments in the American Theatre since 1900 as reflected through the major playwrights and theatre organizations.
- 215-650. Theatre Management** Credit 3(3-0)
Designed to study the tools of theatre management and producing, box office, price and percentages, publicity, promotion and production costs. Dealing with publishers and agencies. Community theatre problems are analyzed. Prerequisite: None.
- 215-651. Children's Theatre** Credit 2(2-2)
(Formerly Theatre 650)
Various techniques used in producing children's theatre with adult actors; experience in scene design, lighting, costuming, acting, directing and promotion; class work plus participation in the Children's Theatre Workshop are required. Prerequisite: Theatre 620.
- 215-652. Stage Make-Up** Credit 1(1-2)
Principles of stage make-up; use of materials, wigs, beards and masks. Practical application of all types will be employed to insure understanding. Prerequisite: None.
- 215-653. Principles and Practice of Stage Costume** Credit 3(2-2)
The function of costumes for the stage and for television, and their relationship to other elements of dramatic production. Includes research in construction and authentic period forms. Prerequisite: Consent of the instructor.
- 215-656. Advanced Directing** Credit 3(2-2)
A consideration of rehearsal problems and techniques as may be reflected in the 3-act play. In conjunction with the acting classes and the Richard B. Harrison Players, students direct projects selected from a variety of genres. Prerequisite: Theatre 440.
- 215-667. Seminar in Theatre** Credit 2(2-2)
Advanced individual study for the theatre major in a specialized, concentrated production project. Consent of the instructor and Director of Theatre is necessary. Professional theatre majors only.

LABORATORY COURSES

- 215-100. Speech and Theatre Laboratory** Credit 1(0-2)
A laboratory providing practical experiences within the appropriate discipline. Prerequisite: None.
- 215-200. Speech and Theatre Laboratory** Credit 1(0-2)
A laboratory providing practical experience within the appropriate disciplines. Prerequisites: Speech and Theatre 100.
- 215-300. Speech and Theatre Laboratory** Credit 1(0-2)
A laboratory providing practical experiences within the appropriate disciplines. Prerequisites: Speech and Theatre 200.

215-400. Speech and Theatre Laboratory Credit 1(0-2)

A laboratory providing practical experiences within the appropriate disciplines. Prerequisites: Speech and Theatre 300.

ADVANCED UNDERGRADUATE COURSE

215-680. Independent Study in Speech Communication and Theatre Arts Credit 3(3-0)

An independent study of special topics in the area of speech communication and theatre arts determined by the student in consultation with the instructor. Prerequisite: Permission of Dept. Chairperson and supervising instructor. Junior or senior standing.

SCHOOL OF BUSINESS AND ECONOMICS
Quiester Craig, Dean

DEPARTMENT OF ACCOUNTING
Mark Kiel, Chairperson
Office: 104 Merrick Hall

Undergraduate

510-221. Principles of Accounting I Credit 3(3-1)

Introduction to the basic records and procedures used by service and merchandising organizations in accumulating financial data with emphasis on statement presentation. Includes discussion of special problems of income measurement and asset valuation. Prerequisite: B.A. 220 and Sophomore standing.

510-222. Principles of Accounting II Credit 3(3-1)

Continuation of Principles of Accounting I. Emphasis on financial statement interpretation and the uses of accounting data by management for planning and control. Students are also introduced to the use of computers to maintain accounting records and to prepare financial statements. Prerequisite: Acct. 221.

510-441. Intermediate Accounting I Credit 3(3-1)

Rigorous study of the methodology and underlying theory of financial accounting. In-depth analysis of valuation alternatives and their effect on income measurement. Prerequisite: Acct. 222 and Junior standing.

510-442. Intermediate Accounting II Credit 3(3-1)

A continuation of Accounting 441. A study of accounting theory and techniques underlying the determination of contents and valuation of accounts for the financial statement of a going concern. Prerequisite: Acct. 441.

510-443. Income Tax Accounting Credit 3(3-1)

Study of current principles and concepts of Federal Income Tax laws and related reporting requirements. The application of the tax structure and principles to selected accounting issues. Junior standing or permission of instructor.

510-444. Cost Accounting Credit 3(3-1)

Study of the principles and methodology of product and inventory cost determination and the effect on income measurement for manufacturing concerns, including job order and process costing under historical and standard cost systems. Special attention given to uses of accounting data as an aid in managerial planning and control. Prerequisite: Acct. 222 and Junior standing.

510-445. Selected Topics in Accounting Credit 3(3-1)

Topics covered give additional consideration to selected accounting problems. Current accounting issues/problems and approaches to their resolution are examined. Governmental and not-for-profit topics are also considered. Prerequisites: Acct. 221.

510-446. Managerial Accounting Credit 3(3-0)

Development of accounting concepts and techniques as aids to management planning and control; including budgeting, cost behavior, cost-volume-profit analysis, and responsibility accounting for managerial decision making. Attention also given to the importance of ethics in the management accounting environment. Prerequisite: Acct. 222.

510-545. Advanced Accounting Credit 3(3-1)

Covers partnerships, consignments, special sales contracts, consolidations with related computer applications, governmental accounting and other selected advanced accounting topics. Prerequisite: Acct. 441.

510-561. Auditing Principles Credit 3(3-1)

Concentrates on the conceptual and practical aspects of the examination of financial statements by independent accountants within the framework generally accepted accounting principles and generally accepted auditing standards. Appropriate attention is also given to the objectives and distinguishing characteristics of internal and operational auditing and to the importance and relevance of the Code of Professional Conduct. Prerequisite: Acct. 442.

510-562. Accounting Systems Credit 3(3-1)

Focuses on current techniques of processing and utilizing accounting data for information systems with emphasis on the computer for internal control and reporting. Recognition also given to the appropriate ethical considerations in the development and reporting of accounting information. Prerequisite: Business Education 342, Acct. 441.

510-590. Seminar in Accounting Theory Credit 3(3-1)

The framework of ideas, concepts, and principles which make up the body of knowledge of accounting theory. Prerequisite: Acct. 442, senior standing, and permission of instructor.

510-643. Advanced Income Tax Accounting Credit 3(3-1)

Advanced treatment of tax rules, regulations, and application for individuals, partnerships, fiduciaries, and corporations. Students are also introduced to tax case research and the preparation of corporate tax returns utilizing the computer. Prerequisite: Acct. 443.

DEPARTMENT OF BUSINESS ADMINISTRATION
Georgia W. Bowser, Chairperson
Office: 315 Merrick Hall

Undergraduate

520-220. Business Environment Credit 3(3-0)

The purpose of this course is to provide an understanding of the evolution of American business and an appreciation of the growing responsibilities facing both the company and its leaders. This course also covers business functions, the nature and problems of establishing a business enterprise, elementary mathematical problems and computer concepts for business.

- 520-341. Introduction to Management Information Systems** Credit 3(3-0)
A business systems oriented coverage of concepts, file design, and data representation using the computer. Primary emphasis is placed on factors of analysis, development, design and management of information systems to enhance managerial effectiveness and efficiency. The course also involves an introduction to Basic programming. Prerequisite: Sophomore standing.
- 520-420. Human Behavior in Business** Credit 3(3-0)
Introduction of behavioral concepts of concern to management. Emphasis is placed upon the analysis of interpersonal relations, communication practices, and morale factors relative to their effect upon productivity, organizational effectiveness, and personnel systems. Prerequisite: Junior standing.
- 520-422. Introduction to Management** Credit 3(3-0)
This course covers an analysis of the basic managerial processes at the administrative, staff, and operational levels of a firm with consideration given to business ethics and social responsibility in both domestic and international environments. Appropriate attention is given to the role of organization theory as it applies to achieving managerial objectives through available tools for obtaining desired results. Prerequisite: Junior standing.
- 520-430. Marketing** Credit 3(3-0)
Marketing is a basic function in the firm and in the economy. Emphasis is placed on the relationship between marketing activities and the consumer. Includes functional, institutional, and ethical aspects of marketing in both domestic and international economics. Prerequisite: Junior standing.
- 520-431. Marketing Communications** Credit 3(3-0)
The purpose of this course is to acquaint students with the fundamentals of the marketing communications activities of the firm. All marketing mix variables are treated as marketing communications variables. Distinction is made between promotion and communications. Attention is also given to the usage of advertising communications appeals and marketing communications strategies in designing advertising and marketing communications programs. Prerequisite: Business Administration 430.
- 520-433. Retailing** Credit 3(3-0)
Emphasis is on retail store management. Attention is given to store location, layout, personnel, organization, buying, inventory, sales promotion, customer services and operating expenses. Prerequisite: Business Administration 430.
- 520-435. Sales Management** Credit 3(3-0)
Treats the fundamentals of planning, acquiring resources, organizing and directing activities associated with the sales function of an on-going enterprise. Prerequisite: Business Administration 430.
- 520-437. Consumer Behavior** Credit 3(3-0)
Develops the knowledge of the behavioral content of marketing in consumer, industrial, and international fields. Examines the applicable theory, research findings, and concepts that are provided by psychology, sociology, anthropology, and marketing. The course stresses the conceptual models of buyer behavior based upon sources of influence: individual, group, culture, environment. Prerequisite: Business Administration 430.
- 520-440. Business Information Systems** Credit 3(3-0)
This course involves the evaluation of information systems. It includes three steps: (1) problem recognition; (2) system analysis (feasibility study), which involves collecting, organizing, evaluating facts about a system and the environment in which it operates; and (3) system design, in which a general outline of the proposed solution is used to produce a detailed design. Prerequisite: Business Education 342 or C.S. 250, and Junior standing.
- 520-453. Business Finance** Credit 3(3-0)
An introduction to the financial problems of business organizations, the finance function and its relationship to other decision-making areas in the firm, the concepts and techniques for planning and managing the acquisition and allocation of financial resources from the standpoint of internal management. Prerequisite: Accounting 222 and Junior standing.
- 520-455. Investments** Credit 3(3-0)
Analyzes the various types of corporate and public securities, examines the operation of securities markets. Prerequisite: Business Administration 453.
- 520-461. Legal Environment of Business** Credit 3(3-0)
(Formerly Business Administration 451)
An introduction to the legal system and environment in which business and the government operate. An examination of the creation of rights, liabilities, and regulations under the law as expressions of social and economic forces. Substantial coverage includes business organizations and society, administrative agencies, consumer protection, property ownership and contractual relations. Prerequisite: Junior standing.
- 520-462. Business Law** Credit 3(3-0)
(Formerly Business Administration 452)
Using the background provided in Business Administration 461, topics related to the legal implications activity will be continued. Coverage includes negotiable instruments, sales of goods, security and debt, bankruptcy, commercial papers and government regulation. Prerequisite: Business Administration 461.
- 520-463. Commercial Law** Credit 3(3-1)
The critical provisions of the Uniform Commercial Code will be examined in detail. Other topics will include anti-trust, security law, suretyship, professional liability, bulk transfers, and labor law. Prerequisite: Business Administration 461 and Senior standing.
- 520-464. Risk and Insurance** Credit 3(3-0)
Introduction to risk management with emphasis on varied applications of insurance as a technique for treating uncertainty. Prerequisite: Junior standing.
- 520-465. Real Estate** Credit 3(3-0)
Analyzes the fundamental laws of real property with special emphasis on the changing character of the urban economy, buildings, and land use and their values. Prerequisite: Junior standing.
- 520-466. Real Estate Finance** Credit 3(3-0)
Overview of real property financing; decision-making emphasis. Topics include present value calculations, underwriting residential and income property loans, mortgage law, kinds of mortgages, mortgage markets, and type of lenders. Prerequisite: Business Administration 465, Business Administration 453 or instructor consent.

520-470. Urban Transportation Concepts Credit 3(3-0)

An analysis of the role of transportation in the urban scene. Topics covered include transportation needs of the poor, demand for the modes of transportation, and urban transportation planning methods. Prerequisite: Sophomore standing.

520-481. Management Science I Credit 3(3-0)

An introduction to operations research. Basic concepts of management science including selected quantitative models applicable to management decisions involving production, marketing, and finance functions. Coverage will include analytical and theoretical techniques for production and job design, location and layout, scheduling, inventory, linear programming and network models. Prerequisite: Math 112 and Economics 305, and Junior standing.

**520-482. Production Management Credit 3(3-0)
(Formerly Business Administration 480)**

A survey of the major production and operations functions of organizations with various productive systems. Stresses the identification of major problem areas associated with these functions such as aggregate planning, scheduling, man-machine systems, inventory control, etc., and the development of concepts and decision processes for dealing with the problems. Emphasizes the application of modern quantitative techniques relevant to production management. Prerequisite: Business Administration 481 and Junior standing.

520-520. Business policy Credit 3(3-0)

An integrative course that focuses on strategic planning, policy formulation, corporate-wide decision making. The terminal performance objectives of this course involve analysis of a complex organization in order to develop the ability to: identify major problems and opportunities; to establish strategic objectives; and to recommend implementation plans and programs. Prerequisite: Accounting 222, Business Administration 422, 430, 453 and Senior standing.

520-522. Personnel Management Credit 3(3-0)

The student is provided with various skills and techniques which are currently employed in the practice of personnel management. The course covers developments in programs and activities pertaining to the management of human resources with emphasis on the role of management. Topics include management's responsibilities in dealing with people, the role of personnel management, recruitment and selection, performance appraisal, the exercise of authority, and others. Prerequisite: Advanced Junior standing.

520-524. Management Simulation Credit 3(3-0)

A seminar which focuses on simulating the operation of a complex business enterprise into a unified whole for analysis purposes. Emphasis on quantitative techniques utilized for decision-making under uncertainty, market analysis and forecasting analysis, budgeting, interpersonal relationships, administration of the firm, goal-setting and policy formulation. Participants are divided into teams with key corporate duties being assigned and several teams compete against each other in an attempt to operate the firm on the optimum profitable basis. Prerequisite: Senior standing.

520-537. International Marketing Credit 3(3-0)

This course examines the application of marketing, management, and research, with appropriate consideration to institutional and environmental factors associated with international marketing. Case studies are used involving marketing concepts for the international scene. Prerequisite: Business Administration 430.

520-538. Marketing Research Credit 3(3-0)

Types of research techniques used by business coordinated marketing activities with consumer demand. Emphasis is placed upon survey, observational and experimental techniques used in marketing. Prerequisite: Economics 310 and Business Administration 430.

520-539. Marketing Management Credit 3(3-0)

A course to develop an understanding of marketing problems and to survey policies and procedures for the formation, execution and appraisal of marketing programs. Prerequisite: Business Administration 430.

520-550. Financial Analysis Credit 3(3-0)

The course focuses on short-term financial analysis processes and techniques for managing of current assets and liabilities. It emphasizes both practical and theoretical approaches for making optional decisions and includes consideration of appropriate policies and procedures to ensure continuity in decision making. Prerequisite: Business Administration 453.

520-551. Financial Management Credit 3(3-0)

This course concentrates on decisions involving long-term financial commitments and survival of the firm, including capital budgeting policies and procedures, capital structure, long-term financing and cost of capital. Practical approaches and theoretical models are used to examine domestic and multinational aspects. Prerequisite: Business Administration 453.

520-552. Commercial Bank Management Credit 3(3-0)

Analyzes the operations of commercial banks, specifically, and other major financial institutions in general. Emphasis is placed on management decision-making processes. Through case analysis and problems, the student is introduced to cash, loan, deposit, investment, and management problems faced daily by managers of financial institutions. Prerequisite: Business Administration 453 and Economics 415.

550-555. Securities Analysis and Management Credit 3(3-0)

This course treats in much greater depth the security analysis and portfolio management problems introduced in the basic investments course, Business Administration 455. The treatment should be especially valuable for students preparing for careers which will involve (1) using or producing securities analyses and/or (2) managing securities portfolios. Usually this means working with a financial institution, although the market for these skills is much broader. Prerequisite: Business Administration 455.

520-556. Financial Markets Credit 3(3-0)

The course stresses the allocation, accumulation, and liquidity adjustment functions of financial markets. Financial tools such as flow and funds data, portfolio theory, theories of financial structure of interest rates, and security pricing (valuation) techniques will be integrated into the course. Prerequisite: Business Administration 453 and Economics 415.

520-557. Cases in Business Finance Credit 3(3-0)

A senior level course, designed for, but not restricted to, students who have a strong career interest in corporate financial management. The course utilizes cases and readings oriented toward short-term financial management problems. The student is placed continuously in the position of the decision-maker who must support his judgments by identifying each problem succinctly, marshalling appropriate data, analyzing the data, and ultimately arguing for one of the alternatives. Prerequisite: Business Administration 550 or 551 and Senior standing.

520-610. Interdisciplinary Seminar in Transportation Credit 3(3-0)

Geared to current developments in urban transportation; an interdisciplinary course on urbanism and transportation. Prerequisite: Advanced status in business administration, business education, accounting, economics, political science, sociology, or architectural engineering. Prerequisite: Business Administration 470.

**DEPARTMENT OF BUSINESS EDUCATION
AND ADMINISTRATIVE SERVICES**

**Meada Gibbs, Chairperson
Office: 308 Merrick Hall**

530-301. Beginning Typewriting Credit 2(1-2)

Designed to develop a working knowledge of the use of the typewriter toward final mastery of keyboard reaches with drills, simple problems, and techniques of control. Requirement: 45 gwam.

530-302. Intermediate Typewriting Credit 2(1-2)

Emphasis on technical typewriting, tabulation reports, and other advanced practical applications. Requirement: 60 gwam. Prerequisite: Business Education 301.

530-331. Gregg Shorthand I Credit 3(2-1)

Study of theory as outlined in Gregg Shorthand Diamond Jubilee Series. Minimum terminal requirement: 70 wam on practiced matter. Prerequisite: Business Education 302.

530-332. Gregg Shorthand II Credit 3(2-1)

Emphasis is placed on reinforcing shorthand theory as outlined in Gregg Shorthand Diamond Jubilee Series, speed building, and production of mailable letters. Minimum Terminal Requirement: 80 wam on new-matter dictation. Prerequisite: Business Education 302 and 331.

530-334. Microcomputer Usage in Business Credit 3(2-1)

The theory and application of microcomputers in business. Hands-on experience with microcomputers using commercially and noncommercially developed software as it relates to the business environment. Prerequisite: Sophomore standing.

530-342. Business Programming Credit 3(3-0)

An introduction to computer programming design and techniques for management decision-making. Emphasis on the computer as an aid to problem solving and report generation essential to an efficient and an effective management information system. Prerequisite: B.A. 341 or equivalent.

530-360. Business Communications Credit 3(3-0)

The study of communication theory and its applications to business. Emphasis is placed on composing the basic forms of business communication, including correspondence and reports. Attention is also given to the ethical objectives of communicating in the managerial environment. Prerequisite: English 101. Sophomore standing.

530-379. Personal Finance Credit 3(3-0)

Treats the problems faced by individuals in managing personal incomes and expenditures. Emphasis is also placed upon credit, budgeting, borrowing, saving, and insurance. Prerequisite: Sophomore standing.

530-447. Word Processing Concepts and Applications Credits 3(2-1)

Emphasis on the basic concepts of word processing. Treatment of topics including specialized word processing personnel, work measurement and log-in procedures, terminology, and keyboarding applications. Prerequisite: BE 302 and BE 334 or permission of Instructor.

530-568. Office Automation Credit 3(3-0)

Emphasis is given to information processing considerations at the systems level including analysis and management of support activities such as data and records management, word processing, micro- and reprographics, and (tele-) communications. Includes the use of microcomputers and discussion of person/machine interfaces and appraisals of current and future technological trends and their impact on information processing and on the office environment. Prerequisite: Business Administration 341 or equivalent and Senior standing.

530-575. Methods of Teaching the Business Subjects (Basic and Comprehensive) Credit 3(3-0)

Selection, organization, and evaluation of supplementary teaching materials and analysis of techniques in teaching typewriting, shorthand, transcription, related office skills, data processing, book-keeping, general business, business law, business structure, and elementary economics. Construction of teaching units, enrichment materials, and lesson plans for effective teaching at the secondary level. Provisions are made for observation and participation in demonstrative teaching. Prerequisite: Education 300-301, 400; Psychology 320; Business Education 302, 334, and Senior standing.

530-664. Occupational Exploration for Middle Grades Credit 3(3-0)

Designed for persons who teach or plan to teach middle grades occupational exploration programs. Emphasis is placed on occupational exploration in the curriculum, sources and uses of occupational information, approaches to middle grades teaching, and philosophy and concepts of occupational education.

530-665. Occupational Exploration in the Middle Grades—Business and Office Occupations Credit 3(3-0)

Emphasis is placed on curriculum, methods and techniques of teaching and resources and facilities for teaching in the business and office occupations cluster including business and office, distribution and marketing, and communication and media.

**530-670, 671, and 672. Directed Work Experience Credit 1-3(0-1-3)
(Formerly Coordinated Business Experience)**

Observation and field work in selected business firms to contribute practically to the total development of the student's educational experiences. A minimum of 100 hours must be completed for each credit hour. Three hundred hours are required for Business Teacher Education majors. Prerequisite: Junior standing.

530-681. Coordinating Techniques and Job Analysis in Cooperative Educational Programs

Credit 3(3-0)

A study of the role and responsibilities of the coordinator of occupational educational systems. Surveys the organization of the office education programs, the course content of the related class, the supervision of on-the-job trainees, the establishment of working relationships among the school, business, and home; examines pertinent research; emphasizes procedures in job analyses. Prerequisite: Junior standing, and consultation with adviser.

530-682. Administration and Supervision of Business and Office Education

Credit 3(3-0)

Principles of effective administration and supervision of programs sponsored by federal vocational legislation and administered by state and local boards of education; functions of state plans; and study of (1) program standards, (2) classroom supervision and evaluation, and (3) administrative and supervisory duties and problems (including inventories, equipment, co-curricular activities, public relations, departmental records, and staffing. Prerequisite: Senior standing and consultation with adviser.

DEPARTMENT OF ECONOMICS
Office: 325 Merrick Hall

531-300. Principles of Economics (Micro)

Credit 3(3-0)

An introduction to the principles of economics as they relate to individual segments of the society. Emphasis will be placed upon scarcity, supply and demand, consumer behavior, business firms and market structures.

531-301. Principles of Economics (Macro)

Credit 3(3-0)

An introduction to the principles of economics as they apply to the economy as a whole. National income determination, inflation, unemployment, monetary and fiscal policies, and the basics of international economic relations are covered.

531-305. Elementary Statistics

Credit 3(3-1)

An introduction to descriptive statistics including tabular and graphic presentation of data, measures of central tendency and of dispersion; index numbers; probability; probability distributions; sample design and sampling distributions; and estimation. Prerequisite: Math 111.

531-310. Advanced Statistics

Credit 3(3-1)

Introduction to inferential statistics including classical hypothesis testing, chi-square tests and analysis of variances; regression analysis; correlation analysis; time series analysis; and decision theory. Prerequisite: Econ. 305.

531-401. Public Finance

Credit 3(3-0)

Analysis is made of the way federal, state, and local governments obtain and spend their revenues. Tax theories, incidence and impact are covered. Factors influencing governmental fiscal policies.

531-405. History of Economic Thought

Credit 3(3-0)

A survey of the history of economic thought from the Middle Ages to John M. Keynes. The course aims to show how, and under what conditions the more important laws and theories have become a part of the body of modern economics.

531-410. Intermediate Microeconomic Theory

Credit 3(3-0)

Theoretical analysis of consumer demand; production and costs; optimum output and pricing behavior under various market conditions; allocation of factors of production and distribution of income; general equilibrium and welfare economics. Prerequisite: Econ. 300 and Junior standing.

531-412. Quantitative Analysis

Credit 3(3-0)

This course is intended to provide students with a solid foundation to basic mathematical methods employed in macro and micro economic theory. It includes elementary application of calculus and analytical geometry, and matrix algebra to illustrate income — expenditure model, demand theory, production function, problems of cost minimization and profit maximization, and linear programming. Prerequisites: Econ. 300, 301; Math 111, 112 or 131.

531-415. Money and Banking

Credit 3(3-0)

An introduction to money, banking, and recent developments in the U.S. financial system. The functions and definitions of money, various types of financial intermediaries and instruments, commercial banking and credit creation, the Federal Reserve System, monetary theory and policy, and international banking are covered. Prerequisites: Econ. 310 and Junior standing.

531-420. National Income Analysis

Credit 3(3-0)

An intermediate level exploration of macroeconomic phenomena. Topics include aggregate demand and supply, income determination, equilibria in money and commodity markets, expectations theories, consumption, investment, inflation and unemployment trade-off, and monetary and fiscal policies for stabilization. Prerequisites: Econ. 301 and Junior standing.

531-425. Economics of Transportation

Credit 3(3-0)

Application of the tools of economics to problems of the transportation industry. Topics include economic regulation, cost-benefit, rate structure, externalities and social vs. individual decision making.

531-430. Computer Analysis of Business and Economic Data

Credit 3(3-0)

Introduction to the use of interactive and Batch systems for analysis of business and economic data; using statistical packages and the use of computer for computation of measures of central tendency, measures of dispersion, correlation, testing hypothesis, chi-square, t and F statistics, and linear regression. Emphasis on structured use of Fortran in implementing packages. Prerequisite: Econ 310.

531-501. Labor Problems

Credit 3(3-0)

An introductory course focusing on dealing with the efforts of working people to improve their relative position in the economy; the influence of unionism and of government participation are emphasized.

531-505. International Economic Relations

Credit 3(3-0)

National specialization and international exchange. The history and significance of international trade among nations of the world.

531-510. Business Cycles

Credit 3(3-0)

The general instability of capitalism and its causes, seasonal fluctuations and the secular trend. Business cycle history and theories. The influence of cycles on government fiscal policy.

531-512. Introduction to Econometrics Credit 3(3-0)

This course is intended to provide the student with a working knowledge of applications of modern statistical tools for the formulation and the verification or refutation of economic theories. Primary attention is given to quantitative estimates of parameters in single equation stochastic models. The course also introduces the student to simultaneous-equation models. Prerequisite: Econ. 310 or consent of the instructor.

531-515. Comparative Economic Systems Credit 3(3-0)

A description and analytical study of the various systems that have developed in different countries at different times, motivations, production and distribution patterns.

531-520. Economic Development Credit 3(3-0)

This course surveys the problem of economic growth and development in modern times and analyzes the present efforts to increase the rate of economic growth. Selected case studies will be drawn from both highly developed nations and lesser developed nations. Special emphasis will be given to disproportionate growth in sectors of the United States economy.

531-525. Economics Seminar Credit 3(3-0)

The use of economic tools in delineating, analyzing and presenting economic problems that are not included in other courses. This course will include also an exposure to recent development in economics.

531-599. Independent Study Credit 3 or 6

This course is designed for students involved in Cooperative Work-Study Program where the length and nature of their involvement warrants the awarding of such credit. The following conditions must be met in order to receive credit: (1) The credit will be determined by the department chairman at the time of registration; (2) the student must be registered at the University during the off-campus assignment; (3) the student should spend a minimum of three months in the off-campus experience for each three semester hours of academic credit. When the off-campus experience is in the form of seminar exposure, then not less than forty-five (45) clock hours should represent three semester hours of academic credit; (4) the student will be required to present a written report and/or other evaluation criterion that will be evaluated by the supervising teacher. Any special problem or technical report pursued by the student will be subject to prior approval by the department chairman or supervising teacher. Prerequisite: Consent of the advisor and/or department chairman.

Advanced Undergraduate and Graduate

531-601. Economic Understanding Credit 3(3-0)

An introduction to the principles of economics utilizing the macro approach. No credit towards a degree in economics.

531-602. Manpower Problems and Prospects Credit 3(3-0)

An analysis of manpower development problems and prospects, with particular reference to the problems of unemployment, underemployment and discrimination. The course will focus on problem measurement, evaluation of existing policy and prospects for achievement of all human resource development. The course will invite an interdisciplinary participation on the part of students and faculty. Prerequisites: Econ. 300 or 301; Econ. 305 or equivalent, or consent of the instructor.

531-603. Manpower Planning Credit 3(3-0)

Manpower planning centers chiefly on the adjustment necessary to adapt labor resources to changing job requirements. This course is designed to prepare students to create plans which will facilitate this adjustment. This course will attempt to acquaint the student with labor force and labor market behavior such that he is able to make planning decisions relating to job creation (increasing demand) and education and training (increasing supply). Planning will be done at both the national (macro) and local (micro) levels, with special emphasis on the latter. We will further attempt to evaluate all planning decision by use of Cost-Benefit Analysis or Multivariate Analysis. Prerequisite: Econ. 300 or 301; Econ. 305 or equivalent, or consent of the instructor.

531-604. Economics Evaluation Methods Credit 3(3-0)

The course will cover needed tools of research design, statistical reporting, cost benefit analysis and other related techniques for internal and external evaluations of human resource development programs. The course is designed both for inservice personnel currently employed by agencies, and for the regular student enrolled in a degree-granting program.

531-610. Consumer Economics Credit 3(3-0)

This course is designed to acquaint the student with the nature, scope and tools of consumer economics. It is particularly oriented to minority groups, thus focusing on the economic choices currently affecting groups with rising incomes and aspirations. This course will consider the economic choices faced by the consumers in maximizing satisfaction with limited means.

531-615. Economic, Political and Social Aspects of the Black Experience Credit 3(3-0)

A study of the political, economic and social tools of current public policy treating the subject of race in America. This course will examine the economic and social conditions of income inequality and explore the national commitment to equal opportunity. Special emphasis will be placed on illustrations from North Carolina and adjacent states.

531-626. Physical Distribution Credit 3(3-0)

Analysis of alternative sources of transportation for moving raw materials into the production facility and finished goods into the channels of distribution. Illustrates integration of transportation decisions with those of production, inventory, warehousing and marketing management. Uses quantitative and non-quantitative concepts for plant and warehouse location decisions.

531-690. Special Topics in Economics Credit 3(3-0)

An examination of problems and analytical techniques in economics. The pursuit of certain specific or problem oriented area in economics not covered in other courses. Course content may vary from semester to semester. May not be repeated for credit.

531-701. Labor and Industrial Relations Credit 3(3-0)

Two important sectors of the economy are examined — Labor and Management. Historical, public and governmental influences are studied.

531-705. Government Economic Problems Credit 3(3-0)

This course will consider the growth of public expenditures and revenues, and debt of the United States: theories of taxation and tax incidence; and the effects of public expenditures and taxes on economic growth.

531-710. Economic Development and Resource Use Credit 3(3-0)

This course deals with resource and economic development in the domestic economy and also a comparison drawn among development, developing and undeveloped societies.

531-720. Development of Economic Systems Credit 3(3-0)

An analytical approach to the study of various economic systems, how these systems developed and how they are organized to carry on economic activity.

TRANSPORTATION

531-360. Introduction to Transportation Credit 3(3-0)

Survey of the historic development and socio-economic impact of our nation's transportation system — and the interrelatedness of several modes (water, air, rail, motor and pipeline). Prerequisite: Econ. 300; Corequisite: Econ. 301.

531-450. Carrier Management Credit 3(3-0)

Introduction to the practical application of management practice and policies in the carrier sector of the Transportation industry.

531-460. Traffic Management Credit 3(3-0)

Concepts and problems of freight traffic management, rate-making theories; rate and classification systems. Practical rate problems will be solved. Prerequisite: Econ. 425 or consent of the instructor.

531-650. Transportation Law Credit 3(3-0)

A detailed review of the development of transportation law will be made. An analysis of the Interstate Commerce Act and its impact on surface carriers will be completed. This course will assist those students planning to take the bar exam for the Interstate Commerce Commission or those students studying for the Transportation Law exam in the American Society of Traffic and Transportation series. Prerequisite: Business Administration 461 — Legal Environment of Business or equivalent in recommended.

531-660. National Transportation Policy Credit 3(3-0)

A seminar on national transportation problems. This course will involve readings and research on several issues in transportation. Previous policy statements will be reviewed in light of current needs to determine what the current national transportation policy should be.

SCHOOL OF EDUCATION
Albert Walker, Dean

**DEPARTMENT OF CURRICULUM
AND INSTRUCTION**

Charles Hayes, Chairperson

Undergraduate

311-100. Orientation Credit 1(1-0)
(Formerly Elementary Education and Reading 100)

A familiarization with methods of improving study, taking notes and using the library.

311-300. Introduction to Education Credit 2(2-0)

An overview of the historical background of the systems of education in the United States, their aims, organization and procedures, and of the principles and practices on all levels of the American educational system; emphasis on North Carolina.

311-301. Philosophical and Sociological Foundations of Education Credit 2(2-0)

A view of the educative process and its philosophical foundations; emphasis on the philosophical implications of education as they relate to student curriculum, teacher, and the institution.

311-302. Field Experiences and Community Services Credit 1-3

Field experiences as tutor, assistant, participant or employee in a school or education related institution, organization, agency, community, church, business or industrial program involving interaction with children, youth or adults. Evaluation and written reports required. Planned in consultation with an instructor.

311-303. Socio-Philosophical Aspects of Education Credit 4(4-0)

An examination of past and contemporary factors in American Education through philosophical and sociological perspectives. Exploration of problems and possibilities inherent in relating theory and practice in education.

311-315. Family, Community, and School Credit 3(3-0)
(Formerly Elementary Education and Reading 315)

Study of the relationships of the family, community, and school that involve the learner, with emphasis on the young child. Attention to family structure, parent education and involvement with the school and community, community development and participation in education. Consideration of research and identification of current problems and issues. Projects relating to the local community.

311-343. Methods and Materials of Bibliography Credit 2(2-0)

An examination and valuation of the principles and methods of bibliographic planning with emphasis on library skills and research techniques.

- 311-400. Psychological Foundations of Education — Growth and Development** Credit 3(2-2)
Restricted to Teacher Education Students. Psychological principles governing the interests and needs of pre-adolescence and adolescence; emphasis is placed on general principles of growth and development; physical, motor, intellectual, social, emotional and moral aspects. Observing, recording and interpreting human behavior including functional conceptions of learning will be provided in laboratory settings. Prerequisites: Psychology 320, Curriculum and Instruction 300, 301.
- 311-402. Extramural Studies I** Credit 1-3
 Off-campus experiences, testing or exploring relevance of education to real world situations in an agency, organization, institution or business. Project report and evaluation by permission of department.
- 311-413. Learning and Practice** Credit 3(3-0)
 Survey and analysis of learning theories and the learning process with applications to education. Integration of theoretical viewpoints and research findings with observations and experience in classroom situations. Prerequisite: Psychology 320.
- 311-436. Tests and Measurements** Credit 3(2-2)
 A basic study of standardized and teacher-made measuring devices, acceptable methods of selecting, administering, and interpreting all types of tests applicable to the school and classroom.
- 311-451. Foundation of Early Childhood Education** Credit 2(2-0)
 (Formerly Elementary Education and Reading 451)
 The study of the historical background and the sociological, philosophical, economic factors, and current issues relating to early childhood education; the physical plant, equipment, supplies and other facilities necessary for appropriate experiences.
- 311-500. Principles and Curricula of Secondary School** Credit 3(3-0)
 The history, nature, and function of the secondary school and its relationship to the elementary school and adult life. Prerequisite: 12 semester hours in education and psychology.
- 311-501. Methods of Research and Evaluation in Health Physical Education** Credit 2(1-2)
 The use of various research methods as applied to health education and physical education and the study of methods of evaluating biological, social, and physiological outcomes for health education and physical education. Elementary statistical procedures are utilized. Prerequisite: Curriculum and Instruction 436.
- 311-510. Teaching Language Arts in the Intermediate Grades** Credit 2(2-0)
 (Formerly Elementary Education and Reading 510)
 Methods, content, resources, and materials for teaching speaking, listening, writing and spelling in grades 4-9.
- 311-511. Teaching Reading in the Intermediate Grades** Credit 2(2-0)
 (Formerly Elementary Education and Reading 511)
 Basic course in the methods, materials, and techniques used in reading instruction from the primary area through the study skills techniques of high school. An examination of learning and the teaching of reading in light of curriculum adjustment and procedures for developing expanding reading skills in grades 4-9.
- 311-512. Social Studies in the Intermediate Grades** Credit 2(2-0)
 (Formerly Elementary Education and Reading 512)
 The instructional program in the social studies. Emphasis on current methods, organization, materials and resources.
- 311-513. Strategies in Teaching Science in the Intermediate Grades** Credit 2(2-0)
 (Formerly Elementary Education and Reading 513)
 The examination design, and evaluation of experiences for teaching science in grades 4-9.
- 311-514. Strategies in Mathematics Instruction for the Intermediate Grades** Credit 2(2-0)
 (Formerly Elementary Education and Reading 514)
 Methods, materials, resources and evaluation for teaching modern mathematics in grades 4-9.
- 311-519. Preschool Materials, Methods, and Practicum** Credit 3(2-2)
 (Formerly Elementary Education and Reading 519)
 Methods, materials and program planning for the preschool child. Directed observation and participation in an established pre-school program such as a day care center, nursery or kindergarten.
- 311-525. Methods of Teaching Art** Credit 3(3-0)
 A study of aims, objectives, methods and techniques of art teaching in the modern schools. Special attention given to planning courses of material and correlation. Required of those wishing to qualify as art teachers. Prerequisites: 30 hours of Art and 15 hours of Education and Psychology.
- 311-526. Methods of Teaching English** Credit 3(3-0)
 A study of materials and methods of teaching English in the high school. Required of those planning to teach English. Prerequisites: English 450, 430; 24 additional hours of English courses above English 100 and 15 semester hours in Education and Psychology.
- 311-527. Methods of Teaching Foreign Languages** Credit 3(3-0)
 A study of the problems and strategies in teaching foreign languages. Special attention given to the matter of classroom aids, equipment, etc. Required of those students planning to teach the subject. Prerequisites: 27 hours of French and 15 semester hours of Education and Psychology.

- 311-528. Methods of Teaching Home Economics** **Credit 3(3-0)**
A study of the objectives, methods, and techniques necessary for teaching vocational home economics on the secondary level.
- 311-529. Methods of Teaching Mathematics** **Credit 3(3-0)**
An evaluation of subject matter, materials, methods, and techniques and objectives in the teaching of mathematics in the junior and senior high school. Required of those planning to teach the subject. Prerequisites: 30 hours of mathematics and 15 hours of Education and Psychology.
- 311-530. Public School Music Methods** **Credit 2(2-0)**
A comprehensive study of materials and methods in the teaching of public school music.
- 311-531. Vocal Methods and Materials** **Credit 3(3-0)**
The teaching of vocal music in the public schools; vocal literature for vocal combinations in the public schools.
- 311-532. Band Methods** **Credit 3(3-0)**
A study of school band organization and administration. Offered Fall semester.
- 311-533. The Teaching of Physical Education** **Credit 3(3-0)**
A study of materials, methods and practice in planning; organizing and conducting physical education class activities. Prerequisite: Physical Education 446 and an adequate number of other physical education courses.
- 311-534. The Teaching of Health Education** **Credit 2(2-1)**
Methods, materials and procedures for the teaching of health in the elementary and secondary schools. Prerequisites: Health Education 220 and 442.
- 311-535. Methods of Teaching Science** **Credit 3(3-0)**
A study of methods, materials and techniques of teaching Biology, Chemistry, Physics, General Science, and Environmental Science in the high school. Required of all those planning to teach in this field. Prerequisites: 27 hours of Science and 15 semester hours of Education and Psychology.
- 311-536. Methods of Teaching Social Sciences** **Credit 3(3-0)**
A study of techniques of social science instruction on the high school level. Required of those planning to teach the subject. Prerequisites: 27 hours of Social Studies and 15 semester hours of Education and Psychology.
- 311-539. Methods of Teaching Speech and Theatre** **Credit 3(3-0)**
A study of the aims, objectives, problems and difficulties experiences in teaching speech in the modern school. Special attention is given to the organization and coordination of both speech and theatre curriculums, to planning courses of study, its presentation, and to the selection of materials and equipment required of all Speech and Theatre Education majors. Prerequisites: 27 hours of speech and 15 hours of Education and Psychology.
- 311-556. Curriculum and Methods in Literature, Language Arts, and Social Studies in Early Childhood Education** **Credit 3(2-2)**
(Formerly Elementary Education and Reading 556)
The study of basic principles underlying the social studies and language arts curriculum; children's literature, appropriate materials and methods for kindergarten-primary grades. Development of concepts and skills relating to the scope and importance of social studies and language arts in the total program. Laboratory and observation experiences.
- 311-557. Curriculum and Methods in Science and Mathematics in Early Childhood** **Credit 3(2-2)**
Basic principles underlying the science and mathematics curriculum. Consideration of appropriate materials and methods for kindergarten through primary grades. Development of concepts and skills relating to the scope and importance of science and mathematics in the schools programs. Simulated teaching experiences.
- 311-558. Student Teaching and Seminar in Early Childhood Education** **Credit 6(2-8)**
(Formerly Elementary Education and Reading 558)
Observation and guided teaching experiences in the kindergarten through grade three to include 90 or more clock hours of actual teaching. The application and practice of methods, techniques, and materials of instruction in a real classroom situation under supervision, includes purposeful observation, organization of teaching materials, participation in other activities.
- 311-560. Observation and Student Teaching** **Credit 6(2-8)**
The application and practice of methods, techniques, and materials of instruction in a real classroom situation under supervision, includes purposeful observation; organization of teaching materials; participation in other activities which will aid in developing a teacher (guidance activities, child accounting, cocurricular activities, parent-teacher associations, teachers' meetings), and ninety or more clock hours of actual teaching. Prerequisites: Overall GPA of 2.00 in both the professional and major components and approval of major department.
- 311-561. Seminar** **Credit 1(1-0)**
A consideration of selected topics and current trends in the field of education.
- Advanced Undergraduate and Graduate*
- 311-600. Organization of Media Collections** **Credit 3(3-0)**
(Formerly Educational Media 600)
Basic course in techniques of book and non-book description, their organization for services in libraries through decimal classification and their subject representation in the public catalog. Practice in laboratory.
- 311-601. Reference Materials** **Credit 3(3-0)**
(Formerly Educational Media 601)
The selection, evaluation, and use of basic reference materials with emphasis on the selection of materials, study of contents, methods of location, and practical application.

- 311-602. Extramural Studies II** **Credit 1-3**
Off-campus experiences with educational programs of agencies, organizations, institutions or businesses which gives first hand experiences with youth and adults and aspects of education. Project reports and evaluation by permission of department.
- 311-603. Production of Instructional Materials** **Credit 3(2-2)**
(Formerly Educational Media 603)
The planning, designing, and production of opaque materials, charts, graphs, posters, transparencies, mounting, bulletin boards, displays, models, mock-ups, spectrums, chalkboards, scriptwriting, and recording techniques.
- 311-604. Administration of Educational Media** **Credit 3(3-0)**
(Formerly Educational Media 604)
Planning, organizing, coordinating, and administering educational media programs. Developing criteria for selection, utilization care, and evaluation of the effectiveness of materials and equipment. Scientific arrangement of learning environments, space and space relations. The planning of facilities and budgeting for program and public relations activities.
- 311-605. Concepts of Career Education** **Credit 3(3-0)**
Career Education and manpower concepts in a changing society with emphasis on career awareness, career exploration, and career preparation for kindergarten through the postsecondary level. Development of career education models and evaluation schema.
- 311-606. Curricular Integration of Career Education** **Credit 3(3-0)**
Integration of Career Education within subject content areas. Special attention to mathematics, social science, science, humanities, and career-oriented programs.
- 311-607. Administration of Career Education Programs** **Credit 3(3-0)**
The organization and implementation of Career Education Programs. Includes methods and models for inservice training for teachers and counselors. Evaluation of Career Education Programs.
- 311-608. Seminar in Career Education** **Credit 3(3-0)**
Review of literature, research, issues and problems in Career Education.
- 311-609. Production for Instructional Radio and Television** **Credit 3(3-0)**
(Formerly Educational Media 609)
Affords opportunities for the student to develop and utilize knowledge and skills in designing settings, lighting techniques, operation of controls, directing, camera operation and care, producing and caring for visuals, video tapes, audio tapes, duplicating of tapes, rear screen projections and sound effects, background music, also producing multi-media mix programs for various situations such as: slide-tape, or multi-image programs through film, slide, and opaque chain. Special provisions for training in preventive maintenance and minor repairs of equipment will be provided.
- 311-610. Broadcasting for Instructional Radio and Television** **Credit 3(3-0)**
(Formerly Educational Media 610)
Presents and evaluates live broadcast programs for instruction within the framework of acceptable criteria supported by the profession. Presenting and evaluating the effectiveness of videotaped or video disc recorded programs as used for instructional situations. To develop guidelines for quality radio and television programs.
- 311-611. Utilization of Educational Media** **Credit 3(2-2)**
(Formerly Educational Media 602)
Applies basic concept to problems in teaching and learning with school and adult audiences. Relates philosophical and psychological bases of communications to teaching. Discusses the role of communications in problem-solving, attitude formation, and teaching. Methods of selecting and using educational media materials effectively in teaching. Experience in operating equipment, basic techniques in media preparation. Practice in planning and presenting a session.
- 311-612. Systems Approach and Curriculum** **Credit 3(3-0)**
(Formerly Educational Media 605)
Analysis of subject content, learners, specifications, and evaluation of objectives, analysis and sequencing of tasks, design of stimulus materials, selecting and evaluating of materials. Planning instructional units.
- 311-613. Developmental Media for Children** **Credit 3(3-0)**
(Children's Literature)
(Formerly Educational Media 606)
A study of children's literature with emphasis on aids and criteria for selection of books and other materials for preschool through late childhood ages, story-telling, and an investigation of reading interests.
- 311-614. Book Selection and Related Materials for Young People** **Credit 3(3-0)**
(Formerly Educational Media 607)
A consideration of literature, reading interests, and non-book materials for young people.
- 311-615. Programming for Instructional Radio and Television** **Credit 3(3-0)**
(Formerly Educational Media 608)
Provides the student with the historical background of radio and television, principles and skills in utilizing the theory, language, signs and symbols, of radio and television. Emphasis will be focused on cooperative team teaching approach, experimentation, and innovation as strategies for programming instruction.
- 311-620. Foundation in Reading** **Credit 3(3-0)**
(Formerly Elementary Education and Reading 630)
Basic reading course; consideration of the broad field of reading—its goal and nature; factors affecting its growth; sequential development of skills, attitudes and interests, types of reading approaches, organization and materials in teaching the fundamentals of reading.

- 311-621. World Recognition/Identification Skills** Credit 3(3-0)
(Formerly Elementary Education and Reading 631)

This course explores phonic (letter-sound correspondence), syntactic (grammar), semantic (meaning), morphemic (structure) and visual word identification techniques for word recognition in developmental, corrective and remedial reading programs. Methods of teaching and materials for introducing and reinforcing the skills are included.

- 311-622. Teaching Reading Through the Primary Years** Credit 3(3-0)
(Formerly Elementary Education and Reading 635)

Methods, materials, and techniques used in reading instruction of pre-school through grade three. An examination of learning, the teaching of reading, and curriculum experiences and procedures for developing reading skills.

- 311-623. Methods and Materials in Teaching Reading in the Elementary School** Credit 3(3-0)
(Formerly Elementary Education and Reading 636)

The application of principles of learning and child development to the teaching of reading and the related language arts. Methods and approaches to the teaching of reading in the elementary school, including phonics, developmental measures, informal testing procedures, and the construction and utilization of instructional materials.

- 311-624. Teaching Reading in the Secondary School** Credit 3(3-0)
(Formerly Elementary Education and Reading 637)

Nature of a developmental reading program, initiating and organizing a high school reading program, the reading curriculum, including reading in the content subjects, critical reading, procedures and techniques, and corrective and remedial aspects.

- 311-625. Theory of American Public Education** Credit 3(3-0)

An examination of the philosophical resources, objectives, historical influences, social organization, administration, support, and control of public education in the United States.

- 311-626. History of American Education** Credit 3(3-0)

A study of the historical development of education in the United States, emphasizing educational concepts and practices as they relate to political, social and cultural developments in the growth of a system of public education.

- 311-627. The Afro-American Experience in American Education** Credit 3(3-0)

Lectures, discussions, and research in the Afro-American in American education, including the struggle for literacy, contributions of Afro-Americans to theory, philosophy and practice of education in the public schools, private and higher education. Traces the development of school desegregation, its problems and plans.

- 311-628. Seminar and Practicum in Urban Education** Credit 3(1-4)

A synthesis of practical experiences, ideas and issues pertinent to more effective teaching in urban areas.

- 311-629. Classroom Diagnosis in Reading Instruction** Credit 3(3-0)
(Formerly Elementary Education and Reading 638)

Methods, techniques and materials used in the diagnosis of reading problems in the kindergarten-primary area through the intermediate level. Attention upon the pupil and the interpretation of physiological, psychological, sociological, and educational factors affecting learning to read. Opportunity for identification, analysis, interpretation on, and strategies for fulfilling the reading needs of all pupils.

- 311-630. Reading Practicum** Credit 3(3-0)
(Formerly Elementary Education and Reading 639)

Application of methods, materials and professional practices relevant to teaching pupils. Provisions for participation in and teaching of reading. Designed to coordinate the student's background in reading, diagnosis, learning, and materials. Supervised student teaching. Prerequisite: 12 credit hours in reading.

- 311-631. Reading for the Atypical Learner** Credit 3(3-0)
(Formerly Elementary Education and Reading 640)

Attention to the gifted child, the able retarded, the slow learner, the disadvantaged, and the linguistically different child. Special interest groups will be formed for investigation reports.

- 311-641. Teaching the Culturally Disadvantaged Learner** Credit 3(3-0)

Psychological and sociological influences on culturally deprived learners and their development; emphasis on the experimental lacks of the culturally deprived learner; and special teaching methods, materials and activities. A consideration of groups of American Indians, Negroes, Puerto Ricans, urban poor, rural poor, Mexican Americans, Mountain whites, and migrant workers who may be culturally deprived.

- 311-683. Curriculum in Early Childhood** Credit 3(3-0)
(Formerly Elementary Education and Reading 683)

Curriculum experiences and program planning appropriate to nursery, kindergarten, and primary education. An examination of theoretical models, bases of curriculum, and objectives relevant to early childhood education.

- 311-684. Methods in Early Childhood** Credit 3(3-0)
(Formerly Elementary Education and Reading 684)

Administration, principles, practices, methods, and resources in the organization of preschool and primary programs. An interdisciplinary and team approach. Observation for teaching styles and strategies.

Graduate

- 311-700. Introduction to Graduate Study** Credit 2(2-0)
Methods of research, interpretation of printed research data, and use of bibliographical tools.

- 311-701. Philosophy of Education** Credit 3(3-0)

A critical study of and a philosophic approach to educational problems. The nature and aims of education in a democratic society, relation of the individual to society, interests and disciplines, play and work, freedom and control, subject matter and method.

311-702. Reading in Modern Philosophy of Education Credit 3(3-0)

Study and analysis of selected topics in philosophy of education.

311-703. Educational Sociology Credit 3(3-0)

The school as a social institution, school-community relations, social control of education, and structure of school society.

311-704. Professional Development of Media Personnel Credit 1(1-0)
(Formerly Educational Media 704)

A course designed to meet specific needs of the media practitioner to include critiques of problems, individualized projects in problem-solving; overview of current issues and trends in media.

311-705. Programmed Instruction Credit 3(2-2)
(Formerly Educational Media 700)

Theory, principles, application, and evaluation of programmed instruction techniques, survey of programmed techniques, the selection, utilization, and evaluation of existing programs. Survey of commercial programs, sources and types of teaching machines. Practice in writing programmed instruction units.

311-706. Media Retrieval System Credit 3(2-2)
(Formerly Educational Media 701)

A survey of various media classifications, storage and retrieval models as applied to information center and their operation. Compares traditional models with the logic of manual, mechanical, and electronic retrieval systems. Writing models for independent study.

311-707. Workshop in Educational Media Credit 3(3-0)
(Formerly Educational Media 702)

An exploration of recent materials, methods, and techniques and the development of skills and competencies in audiovisual communications. Demonstrations and presentations by specialists, audiovisual representatives. Does not count toward degree unless specifically approved.

311-708. Research in Educational Media and Internship Credit 3(1-4)
(Formerly Educational Media 703)

This is a professional laboratory designed to provide the student with on-the-job training and direct experiences relating to his "needs" and interest in operating, organizing, and administering a well-rounded media program and the opportunity to develop research into an area related to the practical experiences.

311-709. Introduction to Theories in Media Communication Credit 3(3-0)
(Formerly Educational Media 709)

Considers concepts, principles, and theoretical orientation from fields of social psychology, communication and general systems. Competencies to include identification of authors and contributions as related to role of various media communications and technologies in the process of learning and culture transmission.

311-710. Methods and Techniques of Research Credit 3(3-0)

Careful analysis and study of research problems; techniques and methods of approach.

311-711. Educational Statistics Credit 3(3-0)

The essential vocabulary, concepts, and techniques of descriptive statistics as applies to problems in education and psychology.

311-712. Advanced Information Services Credit 3(3-0)
(Formerly Educational Media 711)

Analysis of print and non-print resources of specific interest to adult learners. Examination of tools of instruction, bibliographic resources: occupational literature, testing and measurement data, readers' advisory services and programs; self-paced and auto-tutorial study programs.

311-713. Computers in Education Credit 3(3-0)
(Formerly Educational Media 713)

Review of the use of the computer in instruction and related communication. Examination of research on the area; use of various hardware and software configuration; programming language; methods of course and lesson development and production of teaching program utilizing the computer or related use of computer in communication in education.

311-715. Advanced Production in Instructional Radio and Television Credit 3(0-6)
(Formerly Educational Media 715)

An in-depth study of advanced methods and techniques necessary to produce quality instructional radio and television programs. Experimentation, innovations, and research will be encouraged and high production standards in keeping with those of Commercial Stations. Student-produced programs may be broadcast on a cooperative basis over local radio and television facilities. Prerequisite: Curriculum and Instruction 609 or approval of instructor.

311-716. Techniques in Multi-Media Design, Production and Presentation Credit 3(3-0)
(Formerly Educational Media 716)

Application of theories and practices in graphics and film production; utilization of equipment and practice in incorporating two or more media in slide-tape, film loop and/or comparable presentation.

311-717. Media Services to Business and Industry Credit 3(3-0)
(Formerly Educational Media 717)

A corollary course offering that deals with the nature of needs in communication for specific complexes and audiences; design of messages; public relations, marketing and public persuasion, adult learner theories; multi-media production techniques and presentations. Designed for the media major and/or practitioner interested in options in broadening career fields.

311-718. Media in Special Education and Reading Credit 3(3-0)

This course is designed to provide personnel in special education reading programs with experiences that will enable them to develop competencies and skills in the operation, care, and utilization and production of instructional materials and equipment pertinent to the achievement of their instructional objectives.

311-720. Curriculum Development Credit 3(3-0)

Basic concepts and modern trends in curriculum development for grades K-12, the purposes, objectives, and programs of the school; the relationship of allied subject areas to curriculum development; the relationship of the community; and the contributions and interrelationships of administrative personnel, other personnel, and lay persons to curriculum development.

311-721. Curriculum in the Elementary School (Formerly Elementary Education and Reading 721) Credit 3(3-0)

Basic concepts of curriculum and curriculum development with attention to curriculum issues and to desirable instructional practices in the elementary school.

311-722. Curriculum in the Secondary School Credit 3(3-0)

Curriculum development, functions of the secondary school, types of curricula; emphasis on trends, issues, and innovations.

311-723. Principles of Teaching Credit 3(3-0)

A study of the status of teaching as a profession in the United States; teacher obligations, responsibilities and opportunities for leadership in the classroom and community with special emphasis on principles of and procedures in teaching.

311-724. Problems and Trends in Teaching Science Credit 3(3-0)

Attention to major problems of the high school teacher of science. Lesson plans, assignments, tests, etc., constructed and administered by each student in class. Audiovisual materials, demonstration and laboratory techniques carried out.

311-725. Problems and Trends in Teaching Social Sciences Credit 3(3-0)

Survey of major problems in the broad field of social studies and consideration of improved ways of presentation and class economy, including lesson plans, assignments, audiovisual materials, and other means of facilitating learning.

311-726. Reading in the Content Areas (Formerly Elementary Education and Reading 739) Credit 3(3-0)

Attention on reading problems and procedures and materials for improving reading in the social studies, science, English, mathematics, foreign language, home economics, and other fields.

311-727. Workshop in Methods of Teaching Modern Mathematics for Junior and Senior High School Teachers Credit 3(3-0)

Model lesson plans, use of educational media, geometric and trigonometric devices, Truth Tables, and intuitive and formal logic in the teaching of modern mathematics in the junior and senior high school.

311-730. Problems in the Improvement of Reading (Formerly Elementary Education and Reading 740) Credit 3(3-0)

Study of current problems, issues, trends and approaches in the teaching of reading including investigations of underlying principles of reading improvement; coverage of appraisal techniques, materials and procedures, innovative and corrective measures; and application of research data and literature. Prerequisite: A previous graduate course in reading.

311-731. Advanced Diagnosis in Reading Instruction (Formerly Elementary Education and Reading 741) Credit 3(3-0)

The diagnosis and treatment of reading difficulties. Study and interpretation of selected tests useful in understanding and analyzing physiological, psychological, sociological and educational factors related to reading difficulties. Case studies and group diagnosis.

311-732. Organization and Administration of Reading Programs (Formerly Elementary Education and Reading 742) Credit 3(3-0)

Administrative acts requisite to the creation and guidance of a well-balanced, school-wide reading program. For all school personnel who are in a position to make administrative decisions regarding the school reading program.

311-733. Advanced Practicum in Reading (Formerly Elementary Education and Reading 743) Credit 3(3-0)

Actual experiences with youth and teachers in professional activities.

311-734. Seminar and Research in Reading (Formerly Elementary Education and Reading 744) Credit 3(3-0)

Evaluation of recent research concerning findings, approaches, innovations, and organization of reading instruction. Selected topics for reports and research projects. Independent study of selected topics of experimentation. Prerequisite: 24 semester credit hours in graduate courses.

311-775. Independent Reading in Education I (Formerly Elementary Education and Reading 785) Credit 3(3-0)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-776. Independent Reading in Education II (Formerly Elementary Education and Reading 786) Credit 3(3-0)

Individual study and selected reading in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-777. Independent Reading in Education III (Formerly Elementary Education and Reading 787) Credit 3(3-0)

Individual study and selected reading in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-780. Comparative Education Credit 3(3-0)

Historical and international factors influencing the development of national systems of education, recent changes in educational programs of various countries.

311-781. Issues in Elementary Education (Formerly Elementary Education and Reading 781) Credit 3(3-0)

A critical review of the background and functions of the elementary school as a social institution. Attention is given to increasing the ability to formulate the generalizations of development and learning into a meaningful framework for appraising current educational thinking and practice and predicting the direction in which these must move if elementary school programs are to continue to improve.

311-782. Issues in Secondary Education Credit 3(3-0)

An analysis of the role of the high school as an educational agency in a democracy. Attention is given to: (1) philosophical, psychological, and sociological bases for the selection of learning experiences; (2) contrasting approaches to curriculum construction; (3) teaching methods and materials; (4) evaluation procedures; and (5) school-community relationships.

311-783. Current Research in Elementary Education Credit 3(3-0)
(Formerly Elementary Education and Reading 783)

A critical analysis of the current research in elementary education and the implications of such for elementary school educative experiences.

311-784. Current Research in Secondary Education Credit 3(3-0)

A critical analysis of the current research in secondary education and the implications of such for high school educative experiences.

311-S-785. Independent Readings in Education I Credit 1(0-2)

Individual study and selected reading in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-S-786. Independent Readings in Education II Credit 2(2-4)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-S-787. Independent Readings in Education III Credit 3(0-6)

Individual study and selected reading in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-S-790. Seminar in Educational Problems Credit 3(1-4)

Intensive study, investigation, or research in selected areas of education; reports and constructive criticism. Prerequisites: A minimum of 24 hours in prescribed graduate courses.

311-S-791. Thesis Research Credit 3

DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY
Henry Cameron, Chairperson

Advanced Undergraduate and Graduate

312-650. Special Problems in Adult Education Credit 3(3-0)
(Formerly Adult Education 650)

Special topics, individual and group study projects, research, workshops, seminars, summer institutes, travel study tours and organized visitations in areas of adult education worked out and agreed upon by participating students and the Department of Educational Leadership and Policy.

312-651. Introduction to Adult Education Credit 3(3-0)
(Formerly Adult Education 651)

The purpose is to develop a view of Adult Education as a broad, diverse, and complex field of study, research and professional practice. Students will survey many institutions, firms, programs, and individual activities, for insight into the scope of Adult Education, its client group, and their reasons for becoming adult learners, and the range of methods and materials used to enable adults to learn.

312-652. Methods in Adult Education Credit 3(3-0)
(Formerly Adult Education 761)

Methods of informal instruction, group leadership, conference planning and techniques in handling various issues of interest to adults. For persons preparing to conduct adult education programs as well as those preparing to serve as instructors or leaders in the public schools and/or in various agencies serving adults.

312-653. Adult Development and Learning Credit 3(3-0)
(Formerly Adult Education 653)

The focus is on adult development psychology and learning theory. Adult development and learning is grounded in human development psychology, and enables students to investigate the life. From the research literature of adult life stages, students will be asked to read works of Freud, Havinghurst Erikson, Gould, Levinson, Valliant, and Klemme.

312-654. Gerontology Credit 3(3-0)
(Formerly Adult Education 654)

The basic purpose of this course is to study the process of aging. Attention will be given to the influence of cultural, sociological, and economic factors. An important phase of the course will deal with planning for retirement.

312-688. School Law and the Teacher Credit 3(3-0)

Study of statutory and case law relating to the teacher, the student, and the teaching learning environment, with special emphasis on the rights and responsibilities of the teacher and the student.

312-689. Contemporary Issues in Administration Credit 3(3-0)

Familiarize students, managers, administrators and civic leaders with survival skills necessary for job effectiveness and efficiency.

312-690. The Community College and Postsecondary Education Credit 3(3-0)

Philosophy, organization and character of school programs needed to meet educational needs of individuals who desire to continue their education on the postsecondary level. Special attention is given to the trends in developing community colleges. Prerequisites: Education 727, or a graduate course in high school curriculum: Psychology 726, or graduate course in Human Development and Services; or three or more years of teaching experience.

Graduate

312-700. History and Philosophy of Continuing Education Credit 3(3-0)
(Formerly Adult Education 70)

A study of historical and philosophical foundations and thought which have influenced how adult needs have been met through learning. Consideration will be given to the thinking upon which teaching and learning were based during ancient times through the present time.

312-701. Organization, Administration, and Supervision of Adult/Continuing Education Programs Credit 3(3-0)
(Formerly Adult Education 701)

An examination of theories, concepts, and practices as related to the functions, planning, organizing, staffing, financing, motivating, decision making, evaluating, and delegating in an Adult Education organization.

312-702. Practicum in Teaching Adults Credit 3(1-4)
(Formerly Adult Education 702)

Practical experience in involving a group of adults in a teaching learning experience. Under supervision, the practice teacher will have an opportunity to apply concepts, teaching methods, and instruction materials in a real life situation. Prerequisite: Educational Leadership and Policy 651, 653, and 700.

312-703. Seminar on Contemporary Issues in Adult Continuing Education Credit 1(1-0)
(Formerly Adult Education 703)

The course is integrative in nature, thereby offering the student an opportunity to synthesize concepts, theories, and methods of teaching learned in earlier courses. Students will be encouraged to further explore areas of special interest.

312-704. Independent Study Credit 2(2-0)
(Formerly Adult Education 704)

This course permits a student to undertake an analysis of a problem through individual study outside the traditional classroom setting. The problem may be selected from either travel, hobby, or a related job experience. Prerequisite: Permission of the instructor.

312-705. Thesis Research in Adult Education Credit to be arranged
(Formerly Adult Education 705)

312-755. Supervision of Instruction Credit 3(3-0)
Modern concepts and techniques of supervision; the roles of the supervisor, principal, and consultant in curriculum development; and the procedures, problems, and materials of supervising and improving instruction in grades 1-12.

312-756. Supervision of Student Teachers Credit 3(3-0)

A basic professional course for classroom teachers, principals, and supervisors who serve in an official capacity directing the field-laboratory experiences of student teachers.

312-757. Problems in Supervision of the Elementary School Credit 3(3-0)

The nature, theory, and practice of supervision, and the supervisor's role in improvement of instruction.

312-758. Problems in High School Supervision Credit 3(3-0)

A study of problems, techniques, and materials in the improvement of instruction in secondary schools. A course for principals, heads of departments, and supervisors.

312-760. The Junior High School Credit 3(3-0)

The philosophy, organization, administration, curriculum and activities of the junior high school.

312-761. School Organization and Administration Credit 4(4-0)

A comprehensive course in organization and administration of schools, grades K-12, placing primary emphasis on the following areas: (1) formal and informal organizational structure, concepts and practices; (2) the management processes; (3) the administrative functions, with particular reference to personnel, program, and fiscal management; and (4) leadership styles and the leadership role, with special attention to planning, decision-making, and conflict-resolution.

312-762. The Principalship Credit 3(3-0)

A professional education course for the principalship; examines the role of principal in the modern school system with emphasis on planning, programming, and management functions.

312-763. Public School Administration Credit 3(3-0)

Review of school administration, the organization and structure of the school system; agencies of administration and control, legal basis of school administration, standards for administration in the various functional areas.

312-764. Pupil Personnel Administration Credit 3(3-0)

Pupil accounting, records and reports, financial reports, school census, special school reports, pupil adjustment and progress, health and safety, and legal aspects of pupil administration.

312-765. School Community Relations and Communication Credit 3(3-0)

Study of the relationship between the school/school district and the community it serves; community structure, resources and services, inter-agency cooperation, community involvement, committees and volunteer services, publication and media relations; public information, business and organizational cooperation and their interrelation with the school/school district.

312-766. School Planning Credit 3(3-0)

An examination of the principles governing the selection and landscaping of school grounds, location and design of buildings, and care of plant from standpoint of use, sanitation, health and attractiveness.

312-767. Public School Finance Credit 3(3-0)

A current study of the political, legal, and economic aspects of financing public education, with particular attention to school finance in North Carolina. Major areas include: (1) public education and the national economy; (2) the tax structure and sources of revenue; (3) resource allocation and methods of funding; (4) school finance reform; (5) school finance in North Carolina; and (6) practical experience in budget planning and development.

312-768. Principles of School Law Credit 3(3-0)

An analysis of the legal aspects of public education. Constitutional, statutory, and case law, with special attention to North Carolina law, provide the basis for understanding the legal framework and examining legal principles pertaining to such areas as: (1) church-state-education relations; (2) race-state-education relation; (3) school districts; (4) school boards; (5) finance; (6) curriculum; (7) property; (8) teacher personnel; and (9) pupil personnel.

312-769. Problems in Educational Administration and Supervision Credit 3(3-0)

An internship of field study on a supervised project arising out of the needs of the student. Prerequisite: 15 graduate hours, including Organization and Administration, Supervision, and Curriculum.

312-770. Problems in Educational Supervision (Internship) Credit 3(3-0)

An internship of field study on a supervised project arising out of the needs of the student. Prerequisite: 15 graduate hours including Organization and Administration; Supervision of Instruction; Curriculum Development; and Seminar in Educational Problems (Research).

312-771. Program Development: Community Education Credit 3(3-0)

The study of community needs assessment; community program design; program budgeting; grant writing; planning and infusion of education that is multi-cultural into the community education curriculum.

**312-772. Program Management:
Community Education Credit 3(3-0)**

Study of organization and governance of community education; program implementation, direction, supervision and evaluation.

312-776. Principles of College Teaching Credit 3(3-0)

Principles involved in teaching at the college level; techniques of teaching aids, criteria used in evaluation. Prerequisite: Psychology 726, or graduate course in educational psychology.

**312-777. Seminar in Postsecondary
Education Credit 3(3-0)**

A synthesis of current research in postsecondary education relating to administration, curriculum, and faculty development. Prerequisite: Education 690.

312-778. Student Personnel Services Credit 3(3-0)

Analysis of student development programs in postsecondary institutions, including pre-admission, educational, vocational, and personal counseling; career guidance services, attitude and interest assessment, student affairs, rights and responsibilities, and financial aid.

**312-779. Technical Education in
Community Junior Colleges Credit 3(3-0)**

Offers techniques in identifying community needs and in planning curriculums and courses for technical/vocational education. Stresses the role of the two-year college in middle manpower development.

312-781. Internship Credit 3(3-0)

Offers opportunities for students to spend one semester as a teaching or administrative intern in a community college or technical institute in the North Carolina Community College System. Registration only by permission of the instructor.

**312-A-785. Independent Readings
in Education I Credit 1(0-2)**

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

**312-A-786. Independent Readings
in Education II Credit 2(0-4)**

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

**312-A-787. Independent Readings
in Education III Credit 3(0-6)**

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

**312-A-790. Seminar in Education
Problems Credit 3(3-0)**

Intensive study, investigation, or research in selected areas of education; reports and constructive criticism. Prerequisite: A minimum of 24 hours in prescribed graduate courses.

312-A-791. Thesis Research Credit 3(3-0)

**312-792. Advanced Seminar and Internship
in Education Administration Credit 3(3-0)**

Seminar and supervised internship experiences relating to problems in administration and to the needs and interests of the student (restricted to students in the Sixth-Year Program in Administration).

**DEPARTMENT OF HUMAN DEVELOPMENT
AND SERVICES**

Wyatt D. Kirk, Chairperson

SPECIAL EDUCATION CURRICULUM

**320-350. Introduction to
Exception Children Credit 3(3-1)**

An overview of the educational needs of exceptional or "different" children in the regular classroom situation; emphasis placed on classroom techniques known to be most helpful to children having hearing losses, speech disorders, visual problems, emotional, social handicaps and intelligence deviation, including slow-learners and gifted children. An introduction to the area of special education. Designed for classroom teachers. An observation/practicum will be required.

**320-351. Introduction to Learning
Disabilities Credit 3(3-0)**

The identification and education of children and youth with learning disabilities, including teaching strategies, theories, programs and materials.

**320-352. Introduction to Emotional
Disturbance* Credit 3(3-1)**

An introductory course in the education of the emotionally handicapped child. Psychological, sociological, and educational implications will be emphasized. Various theoretical views and approaches will be explored. (Field Experience)

**320-451. Speech and Language
Stimulation for Exceptional
Children Credit 3(3-0)**

The study of normal speech and language development and the disorders of speech and language. Specific competencies would be developed in the habilitation of speech and language disorders frequently associated with the categorical areas.

**320-536. Educational Assessment and
Curriculum Development for
the Exceptional Infant and
Young Child* Credit 3(3-0)**

Evaluation, methods and materials used with the very young and preschool child with mild and moderate handicapping conditions. This course must be taken concurrently with Educational Assessment and Curriculum Development for the Primary and Intermediate Exceptional Child, Educational Assessment and Curriculum Development for the Secondary Exceptional Person and Seminar in Educational Assessment and Curriculum Development.

**320-537. Educational Assessment and
Curriculum Development for
the Primary and Intermediate
Exceptional Child Credit 3(3-0)**

Evaluation, methods and materials used with the primary and intermediate exceptional child with mild and moderate handicapping conditions. This course must be taken concurrently with Educational Assessment and Curriculum Development.

*Students are required to purchase supplemental materials for this course.

320-538. Educational Assessment and Curriculum Development for the Secondary and Adult Exceptional Person* Credit 3(3-0)

Evaluation, methods and materials used with the secondary and adult exceptional person. This course must be taken concurrently with Educational Assessment and Curriculum Development for the Exceptional Infant and Preschool Child, Educational Assessment Curriculum Development for the Primary and Intermediate Exceptional Child and Seminar in Educational Assessment and Curriculum Development.

320-539. Behavior Management of Exceptional Children and Youth Credit 3(3-0)

A survey of relevant research and techniques that are applicable for behavior management in a learning situation for exceptional children and youth.

320-540. Seminar in Educational Assessment and Curriculum Development Credit 3(3-0)

Field experiences designed to provide practice in assessment, methods and materials with the exceptional student. This course must be taken concurrently with Educational Assessment and Curriculum Development for the Exceptional Infant and Preschool Child, Educational Assessment and Curriculum Development for the Primary and Intermediate Exceptional Child, and Educational Assessment and Curriculum Development for Secondary Exceptional Person.

320-541. Teacher-Parent-Community Resources for Exceptional Children Credit 3(3-0)

A survey of the psychological and sociological factors affecting exceptional children and their families as well as techniques used in working and communicating with families of exceptional children and community resources.

320-542. Diagnostic Prescriptive Teaching* Credit 3(3-0)

The study of the diagnostic prescriptive model of Special Education with emphasis on writing individualized programs for exceptional children utilizing curricular variables.

320-543. Practicum in Special Education Credit 3(3-0)

Observation, participation, and teaching in an educational program for special needs children. (Field Experience)

320-544. Student Teaching Credit 6(2-4)

The application and practice of methods, techniques, and materials of instruction in a real classroom situation under supervision, includes purposeful observation; organization of teaching materials, participation in other activities which will aid in developing a teacher (guidance activities, child-accounting, cocurricular activities, parent-teacher associations, teachers' meetings), and ninety or more clock hours of actual teaching. Prerequisites: Overall GPA 2.00 in both the professional and major components and approval of major department.

320-545. Special Education Seminar Credit 3(3-0)

This course is integrative in nature offering the student an opportunity to synthesize concepts, theories and methods learned. Students will be encouraged to explore through research in depth special topics relating to exceptional children and youth.

320-546. Occupational Orientation and Training for the Exceptional Youth Credit 3(3-1)

Background development of job training programs, covering aspects of occupational adjustments in terms of practical academic experiences and employment opportunities. (Field Experience)

320-662. Mental Deficiency Credit 3(3-0)

A survey of types and characteristics of mental deficiencies; classification and diagnosis criteria for institutional placement and social control of mental deficiency.

320-566. Introduction to Mental Retardation Credit 3(3-0)

A study of the degrees, types, diagnoses, and classification of mental retardation, including historical development, curriculum, and theoretical strategies.

320-661. Psychology of the Exceptional Child Credit 3(3-0)

An analysis of psychological factors affecting identification and development of mentally retarded children, physically handicapped children, emotionally and socially maladjusted children, and other children with special needs.

320-663. Measurement and Evaluation in Special Education Credit 3(3-0)

The selection, administration, and interpretation of individual tests; intensive study of problems in testing exceptional and extremely deviant children; consideration to measurement and evaluation of children who are mentally, physically, and emotionally or socially handicapped. Emphasis upon the selection and use of group tests of intelligence and the interpretation of their results.

320-664. Materials, Methods, and Problems in Teaching the Special Needs Child Credit 3(3-0)

Basic organization of programs for the education of the mentally retarded; classification and testing of mental deficiencies, curriculum development and principles of teaching intellectually slow children. Attention is also given to the provision of opportunities for observing and working with children who have been classified as mentally retarded, emotionally disturbed and learning disabled. Techniques for teaching these individual will be explored.

320-667. Specific Learning Disabilities Credit 3(3-0)

This course will address specific learning problems associated with reading, writing, language, cognition, perception, attention, arithmetic, social and emotional disabilities.

320-668. Children & Youth with Behavioral Disorder 3 (3-0)

A study of issues, definitions, classification, characteristics, causes and prevalence of children and youth with behavioral disorders. It will examine models, assessments, and intervention strategies.

*Students are required to purchase supplemental materials for this course.

COUNSELING CURRICULUM

320-435. Educational Psychology **Credit 3(3-0)**

A study of basic problems underlying the psychology of education, individual differences, development of personality, motivation of learning and development, nature of learning and procedures which best promotes its efficiency. (Undergraduate only.)

320-600. Introduction to Guidance **Credit 3(3-0)**

A foundation course of prospective teachers, part-time or full-time counselors who plan to do further work in the field of guidance or education. Special consideration will be given to the nature, scope, and principles of guidance services. No credit toward concentration in guidance.

320-623. Personality Development **Credit 3(3-0)**

A study of the basic processes in personality development, the contents of personality, and the consequences of personality development.

320-706. Organization and Management of Guidance Services **Credit 3(3-0)**

A study of methods by which guidance policies and services may be properly implemented through organizational framework; consequently, leads to more effective organization of current guidance programs.

320-707. Research Seminar **Credit 3(3-0)**

Critical discussions of research projects in progress and of the related literature to such projects. An acceptable written report is required. The course recommended for guidance majors in the degree program and others seeking the School Counselor's certificate. Prerequisite: Guidance 730, prior or concurrent.

320-714. Internship in Guidance **Credit 3(1-4)**

The Internship will be concerned with experiences involved in the organization and operation of the many and varied public school programs and their interaction with community agencies. An extended period of continuous full-time experience must be completed by students who have not had previous teaching experience, with a required supervised field placement. Department approval required. Prerequisite: Education 701 and 702, or 721, or 722.

320-715. Measurement for Guidance **Credit 3(2-2)**

The development of understandings and skills in collecting and interpreting data concerning the individual, and the use of such data in cases studies and follow-up procedures.

320-716. Techniques of Individual Analysis **Credit 3(3-0)**

A study of educational and vocational testing with reference to a general framework for using statistical information in several types of counseling problems. Statistics necessary for the evaluation of psychological and educational measurement will be considered. This course also includes the measurement of aptitude, including special aptitude, with reference to prediction of proficiency in various occupations and curricula.

320-717. Educational and Occupational Information **Credit 3(3-0)**

Study of vocational theories of career development, career counseling, basic resources available in the area of occupational, educational, personal and social information, and their application to Guidance and Counseling.

320-718. Introduction to Counseling **Credit 3(3-0)**

Designed as an introduction to skill development which is essential to effective counseling. Emphasis is upon characteristics of the counseling relationship and their effect upon counseling process. Learning activities such as role playing, audio taping and video taping, and practice interview will be utilized, to help make theoretical constructs concrete and practical. Prerequisite: Human Development and Services 623.

320-719. Case Studies in Counseling **Credit 2(1-2)**

The development of a basic understanding of the case study techniques as used in counseling. Compilation, analysis, diagnosis, and treatment of theoretical and actual counseling case histories.

320-720. Theories in Counseling **Credit 3(3-0)**

A critical analysis of class and contemporary theories of counseling, the nature, rationale, development, research and use of theories in counseling. Major points of view include the psychodynamic rationale, cognitive, behavioral and existential humanistics are studied and compared.

320-721. Independent Studies **Credit 3(3-0)**

Offerings in this area are intended to allow a student in any of our degree programs to demonstrate how well he/she can learn, working alone but under faculty supervision. A student(s) will conduct independent research on a specific topic or a delineated area in Educational Psychology or Counseling. Prerequisite: Departmental permission. Departmental approval before registering for this course.

320-722. Career Education and Vocational Development Theories **Credit 3(3-0)**

What career education is and how to implement it along with the study of career development theories, review of vocational development research, application of theoretical propositions to counseling cases, and writing a proposal to investigate career development concepts, will be the major units.

320-723. Student Personnel Services in Postsecondary Education **Credit 3(3-0)**

Theory and practice in counseling problems of the student personnel staff and other supporting services in the postsecondary setting. An in-depth study of student personnel services such as admissions, orientation, educational advising, student programs, health services, living accommodations, financial aid career counseling and placement will be included.

320-724. Advanced Counseling Theories, Strategies and Techniques **Credit 3(3-0)**

An advanced graduate course designed to offer a thorough in-depth examination of the theoretical basis and research evidence for several specific behavior change techniques. Particular attention will be given to application of selected modes of counseling and application of learning models in counseling procedures. It will provide an opportunity for students to further synthesize their own "personal theory" of counseling.

320-725. Human Resource Internship Credit 3-5(9-15)

An Internship involving an extended period of continuous time experience. Must be completed by each student participating in the Human Resource Concentration. The Internship should be a learning experience, a work experience and an on-the-job training thus, one who completes the internship will be more knowledgeable in the field of Human Resource Counseling. Each student will receive a copy of the job description outlining the duties to be performed in the agency. Students who are placed will intern as Human Resource Administrators, Human Resource Planners, or Human Resource Program Evaluators for a semester during each year. Students are responsible for preregistering for the Human Resource Internship one semester prior to the actual placement with departmental approval required. Prerequisite: Professional Core.

320-726. Educational Psychology Credit 3(3-0)

A study of applications of psychological principles to educational practices.

320-727. Child Growth and Development Credit 3(3-0)

A comprehensive analysis of physical, mental, emotional, and social growth and development from birth through adolescence.

320-728. Measurement and Evaluation Credit 3(2-2)

A consideration of measurement techniques and interpretation of group tests and individual pupil diagnostic tests.

320-729. Mental Hygiene for Teachers Credit 3(3-0)

An analysis of the functions of mental hygiene in the total educative process. Attention is given to the basic principles of mental health as these apply to pupils and teachers alike; to the types of adjustment; to the development of personality; and to psychotherapeutic techniques for the restoration of mental health. Prerequisite: Human Development and Services 726.

320-730. Counseling Practicum I Credit 3(1-4)

Designed to provide practical work in the student's area of specialization. Real life experiences are provided in a laboratory setting so that the student may put into practice the knowledge and behaviors gained during previous studies. In addition, a supervised professional experience is required in a setting appropriate to the student's vocational objectives. Learning activities include making and viewing video taped counseling sessions, practice interviews and actual counseling situations. Students are responsible for preregistering for the field placement, one semester prior to the actual placement, with departmental approval required. Prerequisite: Professional Core.

320-731. Group Practicum Credit 3

The course will emphasize the practical use of group techniques, and focus on facilitating the group process. The objectives will be to give students maximum practice in the group setting, with emphasis on both the group activities in guidance work in counseling, with special emphasis on the therapeutic forces for behavior change with the group process.

320-732. Counseling Practicum II Credit 3(1-4)

Designed to provide practical work in the area of specialization. Real life experiences are provided in a laboratory setting so that the student may put into practice the knowledge and behaviors gained during previous studies. A supervised professional experience is required in a setting appropriate. 732 is an addition to 730 to allow for the added hours of field experience being required of our students in order to comply with Guideline 16 of the Standards and Guidelines for counselor preparation.

320-733. Cross-Cultural Perspectives in Counseling Credit 3(3-0)

This course is designed to offer students an opportunity to examine minority cultures in our society. Emphasis will be placed on the need for the development of alternative models to the traditional theories used in counseling of minorities. Examples, Asian, Blacks, Hispanics and Native Americans.

320-734. Counseling Special Populations Credit 3(3-0)

This course is designed to aid students in developing understandings of various psychological needs of special populations and directs specific approaches in addressing treatment. Special populations will involve the elderly, women, and handicapped, just to mention a few.

**DEPARTMENT OF HEALTH, PHYSICAL
EDUCATION AND RECREATION
Deborah Callaway, Chairperson**

330-200. Personal Hygiene Credit 2(2-0)

This course is designed to give the student definite knowledge of the principles of personal health, both mental and physical, and to prepare him for self guidance through and beyond the college years. Emphasis is placed upon information pertinent to social behavior today and upon effective approaches to college living.

330-220. Community Health Credit 2(2-0)

An introductory study of environmental factors which affect health. Emphasis will be placed upon the health of the group rather than that of the individual. Consumer health, community resources for health and prevention and control of disease through organized community efforts will be stressed. Prerequisite: 200.

330-440. Advanced Hygiene and Principles of Health Education Credit 2(2-0)

A comprehensive review of health facts and scientific principles applicable to the prospective teacher, the school child, and the community. Fundamentals of health promotion in the school program are considered. Prerequisite: HE 200; 220.

330-442. First Aid, Safety, and Prevention of Injuries Credit 3(2-2)

Techniques of first aid to the injured in the home, school and community and the teaching of safety measures to be practiced in daily living; the prevention and care of the injuries occurring in physical education classes and in competitive sports. American Red Cross Standard Course leading to certification. Opportunity for obtaining certification in cardio-pulmonary-resuscitation and as an instructor for those who qualify. Prerequisite: Zoology 469.

330-560. The Teaching of Health Education Credit 2(2-1)

Methods, materials and procedures for the teaching of health in the elementary and secondary schools. Field experience will include: observations, service as aides and assistants. Prerequisite: Health Education 220, 440 and 442; Zoology 469 and 560.

- 330-101. Fundamentals of Physical Education** **Credit 1(0-2)**
To develop an understanding of the values and the logic behind exercise and sports activity and regular habits of exercise, to determine the physical fitness needs of the student with the nature, basic rules, techniques and skills of a wide variety of popular American sports and guide him into activities which will be of most interest and benefit to him now and in the future.
- 330-102. Fundamentals of Physical Education** **Credit 1(0-2)**
- 330-103. Physical Conditioning**
To expose the student to concepts of conditioning exercise and fitness testing. Emphasis will be placed on the application and the development of skills necessary for performing properly.
- 330-104. Weight Training** **Credit 1(0-2)**
Introduction to weight training with emphasis on principles, techniques and development of individual programs.
- 330-105. Swimming for Non-Swimmers** **Credit 1(0-2)**
Designed for students who have a fear of the water and a desire to learn to swim.
- 330-107. Beginning Racquetball** **Credit 1(0-2)**
This course is designed to offer the student an opportunity to develop performance skills, an understanding of rules and strategies, and an appreciation for racquetball which one will be able to enjoy as a lifetime activity.
- 330-108. Beginning Springboard Diving** **Credit 1(0-2)**
Introduction to the basic skills, knowledge and mechanics of springboard diving.
- 330-109. Fundamentals of Team Sports** **Credit 1(0-2)**
To develop an understanding of the values and the logic behind exercise and sports activity and regular habits of exercise, to determine the physical fitness needs of the student with the nature, basic rules, techniques and skills of a wide variety of popular American sports and guide him into activities which will be of most interest and benefit him now and in the future.
- 330-110. Fundamentals of Fitness & Slimnastics** **Credit 1(0-2)**
To develop an understanding of the values and logic behind exercise and diet. To point out the benefits of habit and attitude concerning exercise and diet. To guide the student into activities which will be of most interest and benefit now and in the future.
- 330-111. Fundamentals of Gymnastics** **Credit 1(0-2)**
To develop an understanding of the values and logic behind exercise and sports activity and regular habits of exercise, to determine the physical fitness needs of the student with the nature, basic rules, techniques and skills of a wide variety of popular American sports and guide him into activities which will be of most interest and benefit him now and in the future.
- 330-112. Fundamentals of Dance** **Credit 1(0-2)**
awareness of body positions and action, intellectual awareness of how body movement is controlled, and the elimination of muscular tension.
- 330-229. Modern Dance** **Credit 1(0-2)**
To develop an understanding of the various qualities of movement; the techniques of obtaining and applying them in the art form of dance.
- 330-231. Folk and Tap Dance** **Credit 1(0-20)**
Clog, tap and folk dances characteristic of many nationalities.
- 330-233. Social and County Dance** **Credit 1(0-2)**
Ballroom, square, and round dance forms; fundamentals leading and following dance etiquette.
- 330-234. Team Sports: Hockey, Soccer, Basketball** **Credit 1(0-2)**
Fundamental techniques, rules, strategy, terminology and cultural significance of field hockey, soccer and basketball.
- 330-235. Team Sports. Volleyball, Speedball, Softball** **Credit 1(0-2)**
Fundamental techniques, rules, strategy, terminology and cultural significance of volleyball, speedball, and softball.
- 330-237. Group Games, Football and Basketball** **Credit 1(0-3)**
Practice methods and applied techniques of a large variety of games of lower organization of the circle, group, and line types which might be suitable for playground, gymnasium, camp and for adult gatherings. Concentration on developing performance skills and understanding of football and basketball.
- 330-238. Baseball, Track and Field** **Credit 1(0-3)**
To develop performance skills, methods, and techniques in baseball, track and field.
- 240. Introduction to Physical Education** **Credit 2(2-0)**
Survey of the nature and scope of physical education; interpretation of objectives and philosophy of physical education as a part of the total educational program. Qualifications, responsibilities, and opportunities of professional personnel. Evaluation of personal fitness and suitability.
- 330-246. Individual Sports: Archery, Tennis, Badminton, Golf** **Credit 1(0-2)**
Techniques, rules, playing courtesies, and significance of individual sports to college and after school life.
- 330-247. Individual Sports: Recreational Games** **Credit 1(0-2)**
Shuffleboard, handball, deck tennis, table tennis, croquet, modified bowling and horseshoe.
- 330-248. Adapted Physical Education** **Credit 1(0-2)**
Special activities for those students whose physical examinations show that they are unable to participate in the regular physical education program.
- 330-249. Individual Sports and Combatives** **Credit 1(0-3)**
Introduction to basic skills, knowledges, and strategies of non-weapon combatives, badminton, archery, golf, and tennis.
- 330-251. Softball, Soccer and Volleyball** **Credit 1(0-2)**
To develop an understanding of rules, strategy and performance skills in softball, soccer and volleyball.

- 330-252. Touch/Flag Football and Basketball** **Credit 1(0-2)**
Basic skills, rules, and knowledges of touch football, flag football, and volleyball.
- 330-261. Beginning Swimming** **Credit 1(0-2)**
To teach beginning skills in swimming and meet American Red Cross beginner standards.
- 330-263. Rhythmics** **Credit 1(0-2)**
Suitable types of rhythmical activities for boys and men including fundamental movements, folk, tap, social dance and singing games.
- 330-335. Adapted Physical Education** **Credit 1(0-2)**
A continuation of Physical Education 248.
- 330-343. Bowling** **Credit 1(0-2)**
To develop performance skills and techniques in bowling.
- 330-344. Beginning Tennis** **Credit 1(0-2)**
To develop an understanding of rules, strategy and performance skills in tennis.
- 330-354. Intermediate Tennis** **Credit 1(0-2)**
This course is designed to provide the student with advanced and supplementary performance skills, strategies and knowledge in tennis enabling one to more effectively enjoy the activity, assist in or game development, social development, self actualization. The students should have previous satisfactory tennis experience or above average ability in beginning tennis.
- 330-361. Intermediate Swimming** **Credit 1(0-2)**
To teach intermediate skills, strokes, water safety and meet American Red Cross Intermediate and Swimmer standards.
- 330-441. Beginning Golf** **Credit 1(0-2)**
Basic skills, knowledges, and equipment of golf.
- 330-443. Skating for Beginners** **Credit 1(0-2)**
To develop performance skills and techniques in ice skating.
- 330-445. Kinesiology** **Credit 2(2-0)**
A study of the body movements, types of muscles exercise and their relation to the problems of body development. Prerequisite: Zoology 469.
- 330-446. History and Principles of Physical Education** **Credit 3(3-0)**
The evolution of physical education from the earliest time to the present day. Consideration of the relationship of physical education to education and to national life and ideas through the different historical periods. A critical analysis of the scientific basis for physical education with applications of the aims and objectives to the modern concepts of education.
- 330-448. Gymnastics I** **Credit 1(0-2)**
An introduction to the basic skills of tumbling, floor exercise, trampoline and different types of vaulting. The course will include methods and basic evaluation.
- 330-450. Gymnastics II** **Credit 1(0-2)**
Fundamental skills and routines on the following gymnastics apparatus: rings, parallel bars, horizontal bar, and side horse.
- 330-451. Dance Composition** **Credit 1(0-2)**
The rhythmical and musical basis of dance, the elements of dance construction. Theory and practice of skills involved. Prerequisite: 229.
- 330-452. Applied Dance** **Credit 1(0-2)**
A coordinated course designed to increase skills in techniques and the use of related art materials. Prerequisites: 229, 231, 451.
- 330-453. Techniques and Methods in Fall and Indoor Activities** **Credit 2(1-4)**
Theory and practice of field hockey, soccer, archery, golf, basketball, gymnastics, and apparatus. Analysis of performance skills, materials and techniques. Opportunity for officiating and obtaining local and national official rating.
- 330-455. Techniques and Methods of Seasonal and Indoor Activities** **Credit 2(1-4)**
Theory and practice of volleyball, recreational games, speed ball, softball, tennis, badminton, track, and field. Materials and teaching techniques, analysis of skills involved. Opportunity for obtaining official's ratings.
- 330-456. Teaching of Soccer, Football and Basketball** **Credit 2(1-2)**
Consideration is given to the teaching of history, rules, performance skills, methods of organizing practices, strategy team offenses and defenses, and various formations of the three sports. Field experiences will include: observations, service as aides and assistants.
- 330-458. Lifesaving, Water Safety** **Credit 2(0-2)**
The development of aquatic skills and knowledge to meet the requirements for American Red Cross Advanced Lifesaving and for Water Safety Instructor certification.
- 330-461. The Teaching of Individual Sports and Net Games** **Credit 2(1-2)**
Methods and materials for teaching non-contact sports including archery, badminton, handball, tennis, and volleyball. Opportunity for obtaining official's certification in selected activities.
- 330-462. Elementary School Physical Education** **Credit 1(1-2)**
Philosophy, program planning, and methods for teaching children, with particular emphasis on the relationship of physical education to the total educational experience. Experience in basic movement patterns, games, stunts, rhythms, and selected testing activities for K-6 grade children. Observation and instruction of children at various levels. Prerequisites: Physical Education 240 or Admission to the Teacher Education Program.
- 330-562. The Teaching of Physical Education** **Credit 2(1-2)**
The Same As Education 533.
- 330-563. Adapted Physical Education** **Credit 3(3-0)**
Methods of examining and determining needs of the handicapped; activities suitable for individuals with abnormal body conditions, and the conduct of a program of restricted activities to meet their needs. Field experience will include: observation service as aides and assistants.

330-564. Minor Problems in Health and Physical Education Credit 2(2-0)

This course is designed primarily for seniors to provide them with an opportunity to investigate selected professional problems.

330-565. Problems in Physical Education Credit 2(2-0)

Special administrative problems in the organization of physical education programs and the coordination of the different phases pertinent to men and women of professional construction in the light of historical backgrounds, intramural activities, girls' athletics, athletic insurance, and athletic associations.

330-566. The Organization and Administration of Health and Physical Education Credit 3(3-0)

Philosophy and policies in the administration of a health and physical education program, including health services, healthful school living, health instruction, the classification of students, the staff, teaching loads, time schedule, finance, the gymnasium, locker-rooms, equipment, intramural and interscholastic athletics. Field experience will include: observations, service as aides and assistants. Prerequisites: Physical Education 446 and permission of Advisor. Observation and evaluation of programs are required.

330-567. Advanced Techniques and Methods in Physical Education Credit 1(0-2)

A course designed to increase skill in technique and the use of related materials in the areas of dance, sports, gymnastics, aquatics, fundamentals of marching and conditioning activities. Emphasis is placed upon the development of competency in areas of individual student weakness.

330-568. Physical Education Specialization Credit 1(0-2)

Opportunities for careful exploration in dance, aquatics, sports, gymnastics through skill improvement, independent study, field experience and special projects pertinent to the particular area of interest.

330-569. Methods of Research and Evaluation in Health and Physical Education Credit 3(2-2)

The use of various research methods as applied to health education and the study of methods of evaluating biological, social and physiological outcomes for health education and physical education. Elementary statistical procedures are utilized. Prerequisite: Psychology 436.

RECREATION ADMINISTRATION

330-112. Summer Field Experience Credit 6(6-0)

A placement program conducted in cooperation with a formal recreation agency. The student is assigned to an agency during the summer. The student is required to maintain records of daily experiences relative to organization, program, problems, supervision, conferences and budget. Prerequisite: Field Experiences: 402 408, 509 and 510).

330-402. Field Experience I Credit 2(0-4)

Laboratory experiences during the semester in an operating recreational program.

330-408. Field Experience II Credit 2(0-4)

Practices in a Second Agency of Field Experience

330-460. Community Recreation Credit 1(0-2)

A study of city, state, and national organization. Practice in the general principles and techniques in the organization and promotion of leisure activities for home, school, and community. Field experience will include: observations, service as aides and assistants.

330-463. Principles and Practices of Outdoor Recreation Credit 3(2-2)

Philosophy, organization, administration and laboratory experiences in outdoor recreation.

330-464. Group Leadership Credit 2(2-0)

Techniques in group dynamics and methods of developing group leadership capabilities.

330-465. Program Planning in Recreation Credit 3(3-0)

This course is an analysis of recreation programs. Emphasis is placed on objectives, personnel and facilities.

330-446. Camp Administration Credit 3(3-0)

The organization and administration of camp activities. Programming camping activities that will apply to all ages and both sexes.

330-509. Field Experience III Credit 2(0-4)

Practices in a Third Agency of Field Experience.

330-510. Field Experience IV Credit 2(0-4)

Practices in a Fourth Agency of Field Experience.

330-561. Methods of Research and Evaluation in Recreation Credit 3(2-2)

The application of methods of research and evaluation to the various problems in recreation.

330-570. Supervision of Recreation and Park Services Credit 3(3-0)

An analysis and investigation of supervision of employees involved in recreational services.

ATHLETIC TRAINING

330-133. Foundations of Athletic Training Credit 3(2-1)

Practical application of athletic training principles and theory.

330-221. Athletic Training Practicum I Credit 2(0-4)

Athletic training experiences, supervised by a certified athletic trainer. This laboratory experience will be at the Junior High School and Senior High School levels.

330-222. Athletic Training Practicum II Credit 2(0-4)

Athletic training experiences, supervised by a certified athletic trainer. This laboratory experience will be at the College level.

330-332. Organization and Administration of Athletic Training Credit 3(3-0)

Organization and administration of athletic training programs, including Health Services, Law, Finance, Ethics, Treatment, Clinical Evaluation, Therapeutic Concepts and Rehabilitation of Athletic Injuries.

330-449. Athletic Training Practicum III Credit 3(0-6)

Athletic training experiences, supervised by a certified athletic trainer in an organized Recreation or Athletic program.

Advanced Undergraduate

330-651. Personal, School and Community Health Problems Credit 3(3-0)

A study of personal, school and community health problems and resources. Emphasis is placed on the control of communicable diseases, healthful school living and the development of individuals of the scientific attitude and a positive philosophy of health living. Field experiences will include: observations, service as aides and assistants.

330-652. Methods and Materials in Health Education for Elementary and Secondary School Teachers Credit 3(3-0)

A study of the fundamentals of the school health program, pupil needs, methods, planning instruction, teaching techniques, selection and evaluation of materials for the elementary and secondary programs, and the use of the community resources.

330-655. Current Problems and Trends in Physical Education Credit 3(3-0)

A practical course for experienced teachers. Consideration given to individual problems in physical education with analysis of present trends.

330-656. Administration of Interscholastic and Intramural Athletics Credit 3(3-0)

A study of the relation of athletics to education, and the problems of finance, facilities, scheduling, eligibility, and insurance. Consideration given to the organization and administration of intramural activities in the school program.

330-657. Community Recreation Credit 3(3-0)

A study of the recreational facilities and problems with consideration being given to the promotion of effective recreational problems in rural and urban communities.

330-658. Current Theories and Practices of Teaching Sports Credit 3(3-0)

Methodology and practice at various skill levels. Emphasis placed on seasonal activity.

330-669. Exercise Physiology Credit 3(3-0)

The purpose of this course is to provide a theoretical and practical experience in studying acute and chronic effects of exercise on man.

SCHOOL OF TECHNOLOGY
Earl G. Yarbrough, Dean

**DEPARTMENT OF MANUFACTURING
AND AUTOMOTIVE TECHNOLOGY**
Aminur R. Chowdhury, Chairperson

Undergraduate

860-191. Industrial Technology Processes Credit 2(2-0)

An introduction to typical problems encountered in Industrial Technology operations, including metal manufacturing, power technology, electronics, and construction. Shop math is emphasized along with using handbooks and calculators.

860-251. Small Engine Credit 2(1-3)

The principles of engine operations, service and maintenance, trouble shooting, adjustments, overhaul and storing of small engines.

860-252. Automotive Care and Engine Care Credit 2(1-4)

A course designed to study basic car maintenance service and the function and operation of the modern car's electrical and mechanical components.

860-254. Automotive Fundamentals Credit 4(2-4)

A study of the evolution and the latest automotive engine designs. Emphasis on operating principles and fundamental concepts of physics, chemistry and electricity related to engine operating systems.

860-255. Automotive Power Transmission Credit 4(2-4)

A study of fundamental principles of the automobiles power train components. Emphasis on mechanical and fluid power principles of transmitting power and the controlling components brake, steering and etc.

860-275. Fundamentals of Metal Joining I Credit 2(1-4)

The basic course of theory and practice in gas welding, brazing, soldering, cutting, fundamentals of electric arc welding.

860-276. Fundamentals of Metal Joining II Credit 2(1-4)

Continuation of I.T. 275 with emphasis on heliarc welding, spot welding, tig welding, and the latest techniques of metal joining, X-ray, and testing.

860-293. Power Technology Credit 3(2-4)

Instruction is designed to make the student aware of energy sources developed for the modern technological world. Specific instruction is related to basic concepts of power sources. The three methods of transmitting and controlling power, mechanical, fluid, and electrical. Instruction will culminate, with the integration of all aspects of power to develop automated systems for production.

860-451. Automotive Instrumentation Credit 4(2-4)

An introduction to automotive instrumentation and environmental controls. Emphasis is on presenting the anatomy and functions of automobile systems and their effect on the environment, with specific praxiology of modern test instruments for systems malfunctions diagnostics and corrections.

860-452. Automotive Service Management Credit 4(2-4)

An introduction to automotive management full service concepts. Emphasis is on the application of management skills, techniques, methods of problem solving for efficient and effective management and marketing controls. Prerequisites: I.T. 254, 255, and 451.

860-455. Auto Body Repairs and Refinishing Credit 4(2-4)

A basic course in auto body repairs and construction. Modern methods of painting automobiles. Color matching and blending.

860-456. Automobile Body Designs and Repairs Credit 4(2-4)

A study of auto body designs and decisions on repairs or replacements. Estimating rebuilding cost. Study of facilities and equipment.

860-470. Manufacturing Industries Credit 3(1-4)

A basic course in metal manufacturing processes involving planning and design and general metals including bench and sheet metal, forging, and foundry, basic machine tools operations and finishing.

860-471. Metal Technology Credit 3(1-4)

A basic course in Machine Tool Metalworking.

**860-472. Manufacturing Process-
Production I** Credit 4(2-4)

Basic manufacturing techniques with machine tools and precision measuring instruments. Emphasis is placed on the basic machine tool including the lathe milling machine and sharper. Related technical knowledge and new trends in the manufacturing process are covered including numerical control, chemical milling, etc.

**860-473. Manufacturing Processes-
Production II** Credit 4(2-4)

A study of plastics and other materials and their use in modern Manufacturing Processes. Tooling, fabrication methods, and physical properties required production equipment, etc.

**860-474. Manufacturing Technology
of Polymers** Credit 4(2-4)

A fundamental lecture-laboratory course concerning properties and use of polymers in manufactured products. The laboratory includes polymer identification, decorating, testing properties and molding technology.

**860-475. Manufacturing - Advanced
Polymer Processing** Credit 4(2-4)

This is an advanced course dealing with the use of polymers in manufacturing process. The course is laboratory-oriented to provide experience with injection molding extrusion and rheology experiments. Also, included is tooling design of injection molds, compression molds and dies.

**860-480. Mechanical Design and
Manufacturing Problems** Credit 4(2-4)

A basic course in mechanical design and procedures and problems of manufacturing. Some recent advances are covered including critical path scheduling and main machine relations. Prerequisites: I.T. 473, and 475.

**860-481. Manufacturing Processes
(Metallurgy)** Credit 4(3-2)

A basic course in metallurgy consisting of study of raw materials, ferrous and non-ferrous metals and their manufacture. Basic applied metallurgy operations.

860-491. Mechanics of Materials Credit 3(0-6)

A study of physical properties of common materials of industry. Simple stresses, loads, yield strength, ultimate strength, and factors of safety. Applications are made in the areas of riveted and welded joints, pressure vessels and beam design.

**860-493. Industrial Plant Planning
and Management** Credit 3(2-2)

The principles and techniques of plant layout as applied to modern industry. Problems involving in planning new, remodeling old, and expanding present industrial facilities with emphasis on materials handling.

860-495. Dimensional Metrology Credit 3(2-3)

A basic course in the history of measurement, the science of measurement and the language. Modern practices emphasized.

**860-496. Electro-Mechanical
Control Systems** Credit 3(3-0)

A general study of electro-mechanical control systems and components used to control and monitor machines and other automatic systems. Lectures and demonstrations on modern concepts will be a part of the course.

**860-497. Co-operative Training in
Industry I** Credit 4

Students must be in industry full-time for one semester in his major field of work and complete any University Co-Op requirements. he will be evaluated on reports from industry and the University Co-Op Coordinator. The hours earned will be credited toward required technical electives in the Industrial Technology Curriculum. Four semester hours is the maximum to be earned under this arrangement in any one semester. Eight semester hours is the maximum to be earned in the Co-Op arrangement in the Industrial Technology Department.

**860-498. Co-Operative Training in
Industry II** Credit 4

The description of this course is the same as I.T. 497 and is normally the second Co-Op experiences of the student.

860-576. Manufacturing - Production and

Production and operations function; facilities planning, forecasting future demands. Determination of factor-of-production requirements, material handling.

**860-596. Electro-Mechanical Control
Systems (Advanced)** Credit 4(2-4)

An advanced course in electro-mechanical control systems. An in-depth study will be made of hydraulic, pneumatic switching circuits, electric-electronics and mechanical devices used in the control of machines and processes. The course will consist of lectures, demonstrations, problem solving, and laboratory practice.

860-599. Independent Study Credit 3(0-6)

The student selects a technical problem in his major area for special research and study in consultation with a faculty member in this area of interest. He will spend a minimum of 6 hours per week in library research or laboratory experimentation. A technical report in standard format will be required for completion and must be approved by two department faculty members. Prerequisite: Junior or Senior Standing.

Advanced Undergraduate and Graduate

**860-651. Power Industries and
Technology** Credit 3(2-3)

Significance of modern power sources in Industrial Technology. Design and operating principles of steam, water, hydraulic, pneumatic, internal and external combustion units. Nuclear, hydro-electric-electric, gasoline, diesel, turbine rocket, jet, fuel cells, solar energy and other systems. Laboratory experiences involving utilization of power equipment, testing and servicing, with major emphasis on portable power plants.

860-673. Advanced General Metals I Credit 3(2-2)

A course in metal work for teachers of industrial arts. Emphasis will center on art metal (including plating, finishing, etc.), advanced bench metal, sheet metal operations and machines shop. Specifications for equipment, organization on instruction sheets, special problems and materials will be covered as well as shop organization. Prerequisite: I.T. 673.

860-674. Advanced General Metals II Credit 3(2-2)

An advanced course in metalwork for the industrial arts teacher or other person who may require more specialization in one area of metalwork. With necessary prerequisites, the student may select any area of general metals for concentration and special study. Construction projects, special assignments, etc., will be made after the area of work is selected and after consultation with the instructor. Prerequisite: I.T. 673.

860-690. Special Problems in Industrial Technology Credit 3(0-6)

Intensive study in the field of Industrial Technology under the direction of a faculty advisor.

DEPARTMENT OF TECHNOLOGY EDUCATION
Robert B. Pyle, Chairperson

Undergraduate

861-130. Graphic Communication Technology Credit 3(1-5)

Principles, concepts, and skill in using basic graphic arts equipment is stressed in this course. Special projects include relief, lithographic, gravure, block, and silk screen printing; including graphic design, process photography, stripping, plate making, presswork, finishing, and binding. Historical, socioeconomical, organization and occupational aspects of graphic arts and allied industries are investigated.

861-210. General Crafts Credit 3(2-3)

Fundamentals of materials, tools, and skills used in various recreational and developmental craft activities are stressed in this course.

861-218. Introduction to General Shop and Tool Technology Credit 3(2-2)

Fundamentals of shaping materials in general shop using hand tools, portable power equipment found in technology laboratory settings is stressed in this course. The emphasis will be on developing basic skills required for teachers and trainers entering the field.

861-230. Introduction to Photo Technology Credit 3(1-4)

This course is designed to acquaint the beginner with the fundamental processes of photography. Training is given in the nomenclature, operation and maintenance of various cameras; the use of expose meters; film development; contact printing and enlarging; preparation and storage of chemical solutions. Each student is required to provide for himself a camera with adjustable f-stops and shutter speeds.

861-231. Advanced Photography Credit 3(1-5)

This course is a continuation of I.E. 230. Emphasis is given to larger cameras; studio lighting; portraiture; copying; refinement of darkroom techniques; spotting of negatives and prints; selection of chemicals and papers. Students showing high competence in both I.E. 230 and 231 are awarded a Certificate of Proficiency.

861-233. Drafting Technology I Credit 3(1-4)

Basic orthographic projection is emphasized. This course is an introduction to drafting technology tools and procedures. Other topics include lettering, geometric construction, pictorials, auxiliaries, sections, and dimensioning. An introduction to computer-aided drafting is emphasized.

861-234. Drafting Technology II Credit 3(1-4)

Continuation of 861-233. Special emphasis on representation of common geometrical magnitudes, with points, lines, planes, and solids; sectional auxiliary projection; revolution; pictorial drawing, intersection and development.

861-254. Basic Safety and Driver Education Credit 3(2-2)

This course is designed to present the traffic problem in today's society with an overview of the concepts used in traffic accident prevention. Human, vehicle, and environmental factors are studied in their relationship to the total problem. Laboratory experiences will be designed to improve driving attitudes, skills, and knowledge.

861-261. Introduction to Industrial Education Credit 3(3-0)

Designed to acquaint the student with the underlying philosophy, basic principles, and history of industrial arts and vocational education; this course also includes planning, organizing, administering, supervising, evaluating vocational and industrial education/technology programs; with special emphasis given to organization and responsibilities of natural, state, and local agencies.

861-263. Evolution and Organization of Technology Credit 3(3-0)

Historical antecedents, trends and future of technology; socio-economic and ecological impact; structure, functions, organization and activities of enterprise, personnel and associations related to industry and technology.

861-333. Electric/Electronic Drafting Credit 3(1-4)

Emphasis is on drawing and design of electronic equipment and devices found in the manufacturing, installation, and maintenance industries. Topics include: symbols, basic circuits, logic, diagrams, pictorials assemblies, schematics, industrial controls, wiring diagrams, printed circuits, integrated circuits, and electrical building construction wiring diagrams.

861-334. Architectural Drafting Credit 3(1-4)

Principles of planning residential structures and developing production working drawings is stressed. Course topics include the design and drawing of: floor plans, environmental system layouts (heating, and air conditioning), and service system plans (plumbing and electrical). Additionally, issues concerning cost estimation, building codes, and general construction techniques will be introduced.

861-353. Techniques of Laboratory Instruction Credit 3(2-2)

This course is designed to provide the student with the techniques of the in-car, simulation, and range methods of laboratory instruction. Practical experience with beginning driver will be arranged. Prerequisite: S.D. Ed. 254.

861-356. Behavioral Aspects of Accident Prevention Credit 3(3-0)

This course is designed to study the philosophical and theoretical bases of accident prevention efforts in various areas of activities. The behavioral task is analyzed from the physiological, medical and physical, psychological, sociological, and cultural aspects. A critical analysis of attempts to affect safe behavior. Evaluation and written reports required. Planned in consultation with instructor. Prerequisite: S.D. Ed. 353.

861-382. Programming "Basic" for Technology Education Credit 3(3-0)

An introduction to Basic Programming Language is the focus. The objectives are: to acquaint the student with proper and correct way to design and write programs using Basic Language, to teach problem solving techniques, to emphasize interactive applications, to encourage independent study, and to provide practical problems to illustrate the application in academic and real world environments.

861-412. Furniture Design and Construction Credit 3(1-4)

The principles and techniques of furniture construction are included. Course includes furniture design principles as well as reconstruction and finishing techniques.

861-413. Woodturning Credit 3(2-2)

Emphasis is on methods and techniques of teaching woodturning. Included in this course are spindle and face plate turning, re-chucking, plug chucking, finishing, and polishing on wood lathes.

861-415. Comprehensive General Shop Credit 3(1-4)

Principals of operating a general shop are demonstrated. Special emphasis is placed on teaching multiple activities utilizing small group projects. Practice is provided on equipment found in general shop settings.

861-430. Technical Illustration and Design Credit 3(1-5)

Survey of design principles, practices and literature. Axonometric illustration, templates, overlays, visuals, perspectives, air brush.

861-433. Industrial Design I Credit 3(3-0)

The history of industrial design, contemporary design applications, the design process, and materials are covered. Production techniques are explored as well as the processes of cutting, forming, fastening, and finishing.

861-434. Advanced Architectural Drafting Credit 3(1-5)

Planning industrial, commercial and public buildings. Construction and design principles, materials, specifications and codes; complete plans including: plot, landscaping, framing, electrical and mechanical equipment; structural details; reinforced concrete, timber and steel. Advanced perspective rendering, analytical study of historical and contemporary architecture; materials, methods and engineering.

861-435. Architectural Design and Modeling Credit 3(2-2)

Planning and structural design problems of buildings and their relationship to other buildings and space is emphasized. Studies of urban and rural planning; consideration of interior planning, landscape, townscape projects are carried to working detail. Emphasis placed on techniques of model construction.

861-454. First Aid and Emergency Care of the Injured Credit 3(3-0)

A combination of methods and procedures for the emergency care of the injured, and civil defense are stressed.

861-455. Legal Aspects in Safety Education Credit 3(3-0)

A study of federal and state law and judicial interpretations, having application to school, industrial, and traffic programs, will be stressed. Problems such as teacher liability, workmen's compensation, insurance, and traffic laws will be dealt with in respect to their involvement with the industrial and school traffic safety program. Consultation with the instructor.

861-456. Alcohol and Drugs - In Safety and Driver Education Credit 3(3-0)

This course will consist of an investigation into the physiological, psychological, and sociological problems presented by the use of alcohol and drugs. The problem of alcoholism and drug addiction will be treated; efforts of cure and rehabilitation will be explored. Emphasis on the role of alcohol in traffic safety and the role of the school in alcohol education.

861-462. Design, Management, and Safety in the Technology Education Lab Credit 3(3-0)

Lecture. The study of how-to-plan and design a technology education laboratory. Course includes equipment selection and specification, laboratory maintenance and management of a safe environment for technology students. Special consideration will be given to organizing and supervising technology education safety programs along with a review of national, state, and local policies affect in the laboratory setting.

861-463. Career Guidance & Occupational Information Credit 2(2-0)

Principles and techniques of guidance and counseling in junior and senior high schools. With emphasis on the study of industrial occupations and guidance as it relates to industrial education classes.

861-465. Instructional Analysis Techniques Credit 3(3-0)

Analysis of industrial activities, and educational goals; identification of technical, occupational, consumer and recreational need of pupils; delineation of curriculum content and instructional materials. Prerequisite: 463.

861-510. Technology Education General Laboratory Credit 4(2-4)

Lecture and laboratory work stresses the organization and utilization of laboratories for multiple activity technology programs. Instructional materials, procedures, and operating problems will be explored. Student activities in various aspects of industry and technology will be emphasized.

861-533. Machine Design Drafting Credit 3(1-4)

Lecture and laboratory work include advanced machine drawings; dimensions, tolerance of fasteners, analysis of motion and motion diagrams. Study includes welding and numerical control, bearings, couplings, gears, jigs and fixtures, and die design. Fundamentals of computer aided design included.

861-534. Computer Aided Drafting & Design Credit 3(3-0)

Introduction to computer aided drafting and design using microcomputers. Architectural, mechanical and electronic drafting will be considered. 2-D and 3-D drawing will be covered. Programmed and menu driven software will be examined.

861-536. Tool and Machine Design Credit 3(1-5)

Fundamentals of tool design, cutting tools, punches and die design, gage design, jigs and fixtures, indexing and coding procedures. Design, assembly and detail drawings of machines, tools and parts.

861-557. Police and Traffic Court Administration Credit 3(3-0)

A study of the police and court functions in traffic administration with emphasis on records, direction and control, accident investigation, and procedures. Some attention will also be given to parking, pedestrian control, and violations bureau operation. Prerequisite: S.D. 455.

861-558. Introduction to Highway Traffic Administration Credit 3(3-0)

Examination of the United States' highway system, emphasizing efficient safe operation; activities and agencies concerned with increasing efficiency; and systems' developments, social, economic and political impact. Survey of present and future needs. Consult of the instructor.

861-561. Methods of Teaching Safety and Driver Education Credit 3(2-2)

Emphasis is placed on methods and techniques of teaching Safety and Driver Education in the high schools. Areas of investigation include classroom, in-car, range, and simulation methods of instruction. Programmed instruction, team teaching, and other innovative methods will be examined with a view to their use in driver education programs. Organization and administrative of the high school program will also be covered. Prerequisite: S.D. Ed. 356.

861-566. Industrial Education Teaching Methods Credit 3(3-0)

Industrial methodology: Lesson planning, group and individual teaching techniques, media development and use, testing and evaluating outcomes in industrial courses. Prerequisites: I.E. 462, 463, and 465.

Advanced Undergraduate and Graduate

861-610. Internship in Industry I Credit 3(3-7)

Students participate in an industrial setting during a semester in his major field of interest. He/she will be evaluated during industry and a field diary of events and experiences. Three semester hours in the maximum to be earned during

861-611. Internship in Industry II Credit 3(3-7)

Students participate in an industrial setting during a semester in his major field of interest. He/she will be evaluated on reports from industry and a field diary of events and experiences. Three semester hours is the maximum to be earned during a semester.

861-616. Plastic Technology Credit 3(2-2)

Operations in plastics are analyzed and demonstrated. The uses of plastics, how plastics are made and processed are explained. Projects suitable for class use are constructed. For teachers of Technology Education, arts and crafts, and those interested in plastics.

861-617. General Crafts Credit 3(2-2)

Principles and techniques of crafts used in school activity programs. Emphasis on materials, tools, and processes used in elementary schools and industrial arts courses. Open to all persons interested in craft instruction for professional or non-professional use.

861-618. Vocational Education for Special Needs Students Credit 3(3-0)

Opportunities provided for vocational teachers, counselors, and administrators to improve skills in working with disadvantaged/handicapped learners. Emphasis on motivational and creative instructional strategies, discipline drug abuse, module development.

861-619. Curriculum Laboratory in Construction Technology Education Credit 3(2-2)

Construction Technology Laboratory encompassing rationale, strategies, techniques, and media of teaching in the construction field. Specific teaching methods and curriculum approaches will be studied and explored. Secondary, post-secondary, and industrial settings will be studied.

861-620. Curriculum Laboratory in Manufacturing Technology Education Credit 3(2-2)

Manufacturing Technology Laboratory encompassing rationale, strategies, techniques, and media of teaching in the manufacturing field. Specific teaching methods and curriculum approaches will be studied and explored. Secondary, post-secondary, and industrial settings will be studied.

861-630. Photography and Educational Media Credit 3(2-1)

Nomenclature, operation and maintenance of various still and motion picture cameras. The use of exposure meters, film processing, contact printing, slide preparation, film editing, copying, enlarging, preparation and storage of chemical solutions, print spotting, dry mounting.

861-631. Advanced Computer Aided Design Credit 3(2-2)

Emphasis of the course will be utilization of "VERSA CAD" standards, conventions, devices, and experimentation in advance drafting and design practices using computer aided drafting software. Use of literature and research expected. For teachers with undergraduate preparation or trade experience.

861-635. Graphic Arts Credit 3(2-2)

Fundamentals of typography, composition, press operation, block printing, screen printing, offset lithography, other reproduction methods, and bookbinding.

861-651. Driver Education and Teacher Training Credit 3(2-2)

This course provides the student with the necessary preparation to administer classroom and in-car phases of driver education. Special attention will be given to methods of developing safe driving skills and habits.

861-652. Advanced Driver Education and Teacher Training Credit 3(2-2)

Advanced professional preparation in teaching driver education. Laboratory experiences with the multiple car range and driving simulator. Prerequisite: S.D. Ed. 651 or its equivalent.

861-653. Driver Education and General Safety Credit 3(3-0)

Designed to present facts and information concerning the cost, in money and human suffering, of accidents in the home, industry, school, and transportation. Included is the establishment of knowledge and background conducive to the development of personal activities and practice which reduce accidents.

861-654. Highway Transportation Systems Credit 3(3-0)

A description and analytical study of the various transportation systems that have developed in this country. Special emphasis will be given to transportation and its role on economic and social development of communities within this country.

861-655. Automotive and Technology for Safety and Driver Education Credit 3(2-2)

A study of the fundamental systems of the automobiles as they relate to traffic safety.

861-656. Highway Traffic Administration Credit 3(3-0)

This course is to study the origin of traffic laws, the administration of motor vehicles and the adjudication resulting from traffic offenses. A critical analysis of traffic management procedure; past, present, and future. Also explore the agencies involved with traffic study. Consent of the instructor.

861-657. Traffic Engineering in Safety and Driver Education Credit 3(3-0)

An investigation of the vehicle and environmental components of the various types of highway transportation systems. Particular emphasis is given to highway engineering in relation to the flow of traffic in congested and non-congested areas. Traffic studies are performed within the traffic engineering functions, and traffic planning to improve the efficiency of traffic flow and control, and to meet future needs of society.

861-658. Curricula Integration of Safety Education Credit 3(3-0)

Integration of safety concepts and principles in the kindergarten through grade twelve curricula. Philosophy and psychology of safety; strategies, techniques, and materials appropriate for the various grade levels.

861-659. Motorcycle Safety Education Credit 3(2-2)

Theory and laboratory sessions in motorcycle safety education. Emphasis on laws, maintenance, skills, and safe riding habits and practices.

861-660. Industrial Cooperative Programs Credit 3(3-0)

For prospective teachers of vocational education. Principles, organization and administration of industrial cooperative education programs.

861-661. Organization of Related Study Materials Credit 3(3-0)

Principles of scheduling and planning pupil's course and work experience; selecting and organizing related instructional materials in I.C.T. programs. Prerequisite: I.E. 660.

861-662. Industrial Course Construction Credit 3(3-0)

Selecting, organizing and integrating objectives, content, media and materials appropriate to industrial courses. Strategies and techniques of designing and implementing group and individual teaching-learning activities to develop student interest awareness or specialization. Prerequisite: I.E. 462, 463, and 465.

861-663. History and Philosophy of Vocational Education Credit 3(3-0)

Chronological and philosophical development of vocational education with special emphasis on its growth and function in American schools.

861-664. Occupational Exploration for Middle Grades Credit 3(3-0)

Designed for persons who teach or plan to teach middle grades occupational exploration programs. Emphasis will be placed on occupational exploration in the curriculum, sources and uses of occupational information, approaches to middle grades teaching, and philosophy and concepts of occupational education.

861-665. Middle Grades Industrial Laboratory Credit 3(3-0)

Course organization, teaching strategies, resources and facilities for teaching industrial-technological career exploration in Middle Grades is stressed. Emphasis is on occupational clusters in manufacturing, construction, communication, transportation, fine arts, and public service.

861-666. Curriculum Modification for Vocational Education Special Needs Personnel Credit 3(3-0)

For vocational teachers, administrators, and others interested in program modifications for disadvantaged/handicapped learners. Emphasis on curriculum adaptations, instructional planning, teaching strategies, media development, and performance assessment for special needs youth.

861-668. Independent Studies in Industrial Education Credit 3(3-0)

Intensive study in the field of Industrial Education under the direction of a faculty advisor. Prerequisite: Approval of graduate coordinator.

861-669. Safety in the Instructional Environment of Technology Ed Credit 3(3-0)

Principles and techniques of organizing and supervising safety in a Technology Education setting. Emphasis is placed on instructional strategies, state and national laws, special hazards, color coding, and accident analysis. This course is required for T&I certification by the State of north Carolina.

861-670. Introduction to Workplace Training and Development Credit 3(3-0)

Overview of the field of training and development. Management concerns related to organizing, operating, and financing training and development programs are discussed. Roles common to practitioners across the broad field of Human Resource Development are covered. Interpersonal perspectives and implications for the future are included.

861-671. Methods and Techniques of Workplace Training and Development **Credit 3(3-0)**

Emphasis on the methods and techniques common to exemplary training programs. Designing learning programs and selecting appropriate media methods and resources using sound theoretical framework is the goal. Evaluation of programs and instruction is discussed.

861-672. Curriculum Development Using Microcomputers in Industrial Education **Credit 3(3-0)**

The focus will be on theory, principles, and concepts of curriculum development as it applies to computers. This course is designed to provide the student with an opportunity to apply the curriculum development concepts to the computer model.

861-682. Microcomputer Systems for Industrial Education. **Credit 3(3-0)**

The student is introduced to files, diskettes, drives and devices that relate to the microcomputer. Built in and transient utility demands are covered. The MS DOS and Unix systems are introduced with applications to school and research.

DEPARTMENT OF CONSTRUCTION MANAGEMENT AND SAFETY
Walter E. Dukes, Chairperson

862-190. Introduction to Construction **Credit 2(1-1)**

An introductory course to the world of modern industrial technology including a brief history of construction processes and related technology. It will involve the acquisition and processing of natural materials, and how they are molded into the several types of structures.

862-210. Construction Technology **Credit 3(1-5)**

Comprehensive study of basic concepts relating to the technical, managerial, socioeconomic, consumer, and occupational aspects of construction industries. Emphasis on: building principles, systems, practices and codes; planning and designing structures; estimating; organizing and scheduling work; buying and selling real estate. Technical experience in site preparation, foundation construction, framing, finishing, roofing, insulation, and utilities installation. Skill development in performing basic tool and machine operations in carpentry, masonry, electric wiring, and plumbing.

862-211. Introduction to Industrial Processes **Credit 2(2-0)**

An introduction to the technology of industry, with emphasis on describing various general industrial operations and processes. Process steps involved and potential hazards which are introduced are also discussed. Process flow sheets, layouts, descriptions, slides, and guest speakers can be utilized. Laboratory sessions are scheduled for field trips or guest speakers representing various industries.

862-212. Introduction to Occupational Safety and Health **Credit 3(0-6)**

An introduction to occupational safety and health including historical developments, occupational safety and health program concepts, social and legislative requirements, professional relationships, and a general introduction to concepts of recognition, evaluation, and control exposures.

862-213. Wood Technology **Credit 3(1-5)**

Basic concepts relating to the technical, managerial, socioeconomic, consumer, and occupational aspects of wood manufacturing industries. Emphasis on advanced cabinet and furniture construction, advanced machine operation and maintenance, and basic wood finishing. Study includes construction principles, characteristics, properties, and utilization of wood and synthetic materials; fabrication techniques of joinery, forming, and laminating; production methods; technological trends; furniture styles and design principles; mass production techniques, jogs, and fixtures.

862-215. Residential Construction **Credit 4(2-4)**

Principles of light frame construction including foundations, framing, exterior finish and related areas of layout; estimating and ordering materials; conventional and modular component systems.

862-216. Commercial/Industrial Construction **Credit 4(2-4)**

Problems and methods of solution in the construction of commercial buildings; site excavations, foundations, framework, heavy timber, reinforced concrete, structural steel, masonry construction, and related elements.

862-217. Construction Estimating **Credit 4(4-0)**

This course is designed to enable the student to gain competency in estimating the amount of materials, time labor, and equipment required to complete construction projects. A practical approach is made of the procedures used in estimating processes to simplify preparation of formal estimates.

862-311. General Concepts in Occupational Safety and Health **Credit**

The application of prerequisite information to occupational safety and health, health and safety programs, application of knowledge in developing a well-rounded injury/illness prevention program, general concepts of supervisory/employee input, association with regulatory agencies and other organizations.

862-312. Air Quality for the Safety Professional **Credit 3(2-2)**

A study of chemical agents (gases, vapors, dusts, mists, etc.) and related exposures, physiological effects on the human organism, and the recognition, evaluation and control of the exposures in industry. Emphasis is on both theory and performance-related practice. Technical reports are required.

862-411. Hazardous Materials for the Safety Professional **Credit 3(3-0)**

Emphasis is given to liquid and solid substances excluding air contaminants. Lectures include recognition, evaluation, and control of exposures. Given defined exposures, student is required to develop control methods and present them in technical reports.

862-412. Mechanical Systems for Building **Credit 2(2-0)**

The basic principles and advanced practices in the selection, installation, operation and maintenance of equipment in the general areas of water supply and sanitation.

862-413. Industrial Hygiene I **Credit 3(3-0)**

Prerequisites: Chemistry, Physics, and Biology. An introduction to the principles of industrial hygiene and toxicology. Topics include elements of toxicology and occupational disease, airborne contaminants, ionizing and nonionizing radiation, noise and vibration, and heat stress. Emphasis on understanding biological response to and measurement of environment hazards. Application of non-engineering controls with some introduction to the concepts of engineering controls. Laboratory work with industrial hygiene instrumentation.

862-414. Flammable Materials for the Safety Professional **Credit 2(2-0)**

Lectures on gases, vapors, dusts, liquids and solids and their physical and chemical characteristics: flammables, fire retardants, and fire resistant materials. Emphasis is on environmental sampling, evaluation and control methods. Technical reports are required, including fire protection design criteria as specified in building codes and by regulatory agencies.

862-415. Mechanical and Electrical Systems for the Safety Professional **Credit 3(2-2)**

Study of mechanical/electrical systems other than mechanical material handling equipment; mechanical and electrical portable equipment; identification of exposures through system analysis techniques; evaluation of exposures; and the development of control procedures. Technical reports required.

862-416. Industrial Hygiene II **Credit 3(3-0)**

Prerequisites: Industrial Hygiene and Toxicology. Application of engineering principles to the control of environmental hazards. Topics include the principles of ventilations and design ventilation, shielding design for radiation protection, methods of noise controls, control of industrial emissions, and disposal of industrial waste. Interrelationship with safety engineering, fire protection engineering, system safety and occupational medicine.

862-418, (413). Principles of Construction Management **Credit 3(3-0)**

Concepts of the construction industry including the contracting, financing, bidding, organizing coordinating and controlling functions and techniques. Junior and Senior standing.

862-419, (414). Methods in Plane Surveying **Credit 3(1-2)**

A study in determining the positions of points on the earth's surface in relation to each other, including linear and angular measurement in the field. The information thus obtained will be in such a form that it will be readily used for calculations, written descriptions, plotting maps and profiles - need trigonometry.

862-490. Human Relations **Credit 3(3-0)**

A study of problems in the word-a-day world which will aid one in getting along with people on the job, in the community, and the home. These units of work include: habits one may acquire in order to improve human relations, privileges, rights and obligations of a citizen, obtaining and holding a job, labor problems, social and commercial insurance and the use.

862-492. Communicating Technical Specifications **Credit 2(2-0)**

This course puts emphasis on developing proficiency in writing technical reports through collecting, organizing and presenting materials in specialized areas.

862-497. Co-Operative Training in Industry I **Credit 4**

Students must be in industry full-time for one semester in his major field of work and complete any University Co-Op requirements. He will be evaluated on reports from industry and the University Co-Op Coordinator. The hours earned will be credited toward required technical electives in the Construction Management & Safety Department.

862-498. Co-Operative Training in Industry II **Credit 4**

The description of this course is the same as C.M. 497 and is normally the second Co-Op experiences of the student.

862-501. Internship **Credit 3(0-6)**

Work experience under supervision of the department and assigned agency. Evaluation and technical paper required. Prerequisite: Completion of junior year.

862-511. Education/Training Methods for the Safety Professional **Credit 2(2-0)**

Lectures with emphasis on education/training for the control or prevention of occupation injuries or illnesses. Education/training methods, materials and available courses are stressed. Student is expected to determine the need for education/training, design a program for a specific control effort, establish criteria for evaluation of the program.

862-512. Facilities for the Safety Professional **Credit 2(2-0)**

Lecturers and Case Studies, buildings (primarily manufacturing plants and related service and facilities; gas, electricity, water, waste disposals, etc. Emphasis placed on fixed service facilities in the manufacturing operation; lighting, heating and cooling, steam generation, electrical distribution, lighting, etc. Technical reports required.

862-513. Human Factors **Credit 2(2-0)**

Development of understanding of the systems so that human tasks and working environment are compatible with the capabilities and limitation of people. Attention is given to the systems approach in accident prevention, and methods engineering problems for optimum integration of man and machine components.

862-514. Industrial Relations **Credit 2(2-0)**

A study of state and federal Workman's Compensation laws; their history, administration and jurisdiction; and their relationship to injury, accidents, and occupational disease.

862-515. Evaluation and Control Methods in Occupational Safety and Health for the Safety Professional **Credit 3(2-2)**

The development of formal technical reports by groups of students functioning as a team to evaluate specific operations, methods, environments, equipment, etc., and to determine significantly important exposures, develop controls, and justify the controls. Course is performance based.

862-516. Management Techniques in Occupational Safety and Health for the Safety Professional **Credit 3(3-0)**

Management techniques applied to occupational safety and health direction of programs, selection, supervision and evaluation of technical personnel, establishing objectives and priorities, intro-company relations, securing quality performance. Technical reports required.

862-517. Material Handling for the Safety Professional Credit 3(3-0)

Lectures with emphasis on the recognition, evaluation and control of material handling exposures. Design of material handling system, operational analyses, the man-machine-environment relationship in a material handling system and ergonomics are stressed. Case histories are provided and the student is required to write technical reports specifying applicable control methods for assigned case histories.

862-570. Environmental Controls, A.C. and Heating Systems Credit 4(2-4)

A study of principal equipment, design, load calculations for cooling and heating layouts and controls employed in various types of systems. This course is augmented by a practical design problem.

862-571. Commercial Refrigeration Heating and Ventilation Credit 4(2-4)

A study of steam systems, hot water systems, warm air systems and electrical systems used in heating buildings. Load calculation for walk-in cooler and deep freezer and drinking water fountains. Special refrigerating devices and applications.

862-592. Project Management Credit 3(3-0)

An introduction to industrial management with emphasis on planning, organizing, and controlling industrial project development. The course will include materials control and storage, purchasing, quality controls, sales and personnel administration.

862-593. Industrial Safety Credit 3(3-0)

This course is designed for majors in Industrial Technology, whose content focuses on the functions of Industrial Safety and the utilization of OSHA requirements.

862-599. Independent Study Credit 3(0-6)

The student selects a technical problem in his major area for special research and study in consultation with a faculty member in his area of interest. He will spend a minimum of 6 hours per week in library research or laboratory experimentation. A technical report in standard format will be required for completion and must be approved by two department faculty members. Prerequisite: Junior or Senior standing.

862-690. Special Problems in Industrial Technology Credit 3(0-6)

Intensive study in the field of Industrial Technology under the direction of a faculty advisor.

DEPARTMENT OF ELECTRONICS AND COMPUTER TECHNOLOGY

T. H. Avery, Chairperson

863-230. Electricity and Electronics Credit 3(1-5)

A study of electron theory, fundamental units of electricity, electromagnetism, and their relationship to the power factors found in the basic electronic systems.

863-231. Electronic Communication Circuits Credit 3(1-5)

The course is designed to develop competencies related to: combining individual transistor circuits to form various amplifier stages, generating radio frequency signals; verifying principles of amplitude and frequency modulation.

863-234. Electronic Instrumentation Credit 3(2-2)

This course is designed to develop basic competencies related to components and circuits used in instrumentation to include basic transistor configurations; voltage regulators; integrated circuit operational amplifiers, amplifier feedback principles and DC to DC converters.

863-430. Industrial Electronics Credit 3(2-2)

A study of components and circuits in control systems to include: thyratons, thermocouples, thermistors, photo conductive cells, photo voltaic cells, waveshaping, and IC circuits.

863-431. Digital Logic Circuits Credit 3(2-2)

This course will allow students to develop basic competencies in digital logic fundamentals to include encoders/decoders, flip-flops, counters, registers, adders and subtractors; boolean algebra and simplification methods; practice in using digital logic building blocks will be emphasized.

863-432. Electronic Microprocessors Credit 4(2-4)

Students will develop basic competencies in the microcomputer field as they relate to software development for two or more different types of microprocessors. Peripheral devices interfacing to the microprocessor will be emphasized in laboratory experiments.

863-433. Video Electronics Credit 3(2-2)

A study of telecommunications with emphasis on T.V., microwaves, radar, fiber optics, laser and computer CRT in electronic network systems.

COURSES

863-497. Co-Operative Training in Industry I Credit 4

Students must be in industry full-time for one semester in the major field of work and complete any University Co-Op requirements. He will be evaluated on reports from industry and the University Co-Op Coordinator. The hours earned will be credited toward required technical electives in the Electronics & Computer Technology Curriculum. Four semester hours credit is the maximum to be earned under this arrangement in any one semester. Eight semester hours is the maximum to be earned in the Co-Op arrangement in the Electronics and Computer Technology Department.

863-498. Co-Operative Training in Industry II Credit 4

The description of this course is the same as ECT 497 and is normally the second Co-Op experience of the student.

863-599. Independent Study Credit 3(0-6)

The student selects a technical problem in his major area for special research and study in consultation with a faculty member in area of interest. He will spend a minimum of six (6) hours per week in library research or laboratory experimentation. A technical report in standard format will be required for completion and must be approved by two department faculty members. Prerequisite: Junior or Senior standing.

863-690. Special Problems in Technology Credit 3(0-6)

Intensive study in the field of Electronics and Computer Technology under the direction of a faculty advisor.

SCHOOL OF ENGINEERING
Suresh Chandra, Dean
William Craft, Associate Dean

**DEPARTMENT OF ARCHITECTURAL
ENGINEERING**
Peter Rojeski, Jr., Chairperson

Undergraduate

410-111. Introduction to Architectural Engineering Credit 2(2-0)

Lecture, seminar, and laboratory demonstration: An analysis of architectural engineering — preparation, opportunities and professional contributions. Selected lectures and laboratory demonstrations are provided. Individual and group participation of students are encouraged. Introduction to use of computers. Prerequisite: Freshman standing in Architectural Engineering.

410-112. History of American Literature Credit 3(3-0)

This course provides students with knowledge of their physical environment and its relationship to the history of the country, as well as introducing methods of critical and analytical investigation particular to architectural history.

410-122. Architectural Graphics Credit 3(0-6)

Laboratory-lecture course. Orthographic and auxiliary projects, surface intersections and development, oblique and isometric drawing. Descriptive geometry geometric models. Perspectives.

410-132. Materials and Methods of Construction I Credit 3(3-0)

The manufacture and use of materials of construction in exterior walls, interior partitions, floors, ceilings and roofs. Investigation into the physical and aesthetic properties of building materials. A study of construction methods and building codes.

410-221. Building Sanitation and Fire Protection Credit 3(3-0)

Lecture-problems course: Waster water treatment, water supply and distribution. Plumbing systems and fixtures; soil, water and venting systems. Pipe sizing fire protection systems for buildings. Pumps, sprinklers, gravity and pressure vessels, and controls.

410-232. Materials and Methods of Construction II Credit 3(3-0)

Introduction to the use of construction materials in loadbearing applications. Design and construction of wood frame and masonry systems. Review of building codes. Prerequisite: AE 132.

410-311. Computer-Aid Analysis Credit 3(3-0)

Introduction to the use of Fortran programming techniques to solve architectural engineering problems. Emphasis on solving simultaneous equations.

410-321. Theory of Structures I Credit 3(3-0)

Lecture problems course: Reactions, shears, virtual work, moments, truss analysis, influence lines and criteria for maximum moving load conditions. Introduction to space frames and computer analysis. Prerequisite: ME 335, corequisite ME 336.

410-322. Theory of Structures II Credit 3(3-0)

Statically indeterminate structures. Analysis of continuous beams, and multistory frames. Approximation methods and special techniques slope deflection, moment distribution, and column analogy. Analysis indeterminate structures using concepts of plastic methods.

410-331. Architectural Design I Credit 3(0-6)

Introduction to the basic fundamentals of design: space relationships, form and visible structure. Perspective drawing; plans, elevations and sections. Shades and shadows. Prerequisite: AE 122 or permission of instructor.

410-332. Architectural Design II Credit 3(0-6)

Laboratory-lecture course. Presenting a series of problems in space organization and planning with the study of composition and structure. Prerequisite: AE 331.

410-342. Building Illumination Concepts Credit 2(1-2)

Introduction to artificial and natural lighting concepts and analysis techniques. Color and visibility. I.E.S. standards, light sources, efficacy and cost effectiveness. Functional versus co-esthetic lighting. Day-lighting. Prerequisites: EE 200 or equivalent.

410-352. Electrical Systems for Buildings Credit 3(3-0)

Introduction of electrical design for building systems. Review of single and three phase power, load calculations and conductor selection. Transformers, switch gear and power distribution panel. Circuit protection. Power for lighting. Emergency power systems. Motors. Prerequisites: EE 200 or equivalent.

410-441. History of Contemporary Architecture Credit 3(3-0)

A concentrated exposure to the architecture of the late 19th and 20th centuries. Cultural enrichment through exposure to the origins and development of the architecture that surrounds us today.

410-421. Advanced Design Methods Credit 3(2-2)

Description, comparison, and testing of methods available in design with emphasis on problem-solving techniques.

410-431. Architectural Design III Credit 3(0-6)

Laboratory-lecture course presenting a series of problems for study of space analysis, space organization, form and function. Integration of architectural and structural components. Introduction to computer-aided drafting and design. Prerequisite: AE 332.

410-461. Heating, Ventilating and Air Conditioning Principles Credits 3(2-2)

Concepts of energy and building design. Psychrometrics, and human comfort. Design heat transfer functions, heating loads, cooling loads and the refrigeration cycle. Prerequisites: Math 132 and Physics 242.

410-462. Heating, Ventilating and Air Conditioning Systems Credit 3(2-2)

Heating, ventilating and air conditioning central system components. All water-water systems, packaged systems. Introduction to air-side and waterside system design concepts. Space air diffusion and energy recovery systems. Prerequisite: AE 461.

410-471. Steel Structures I**Credit 3(2-2)**

Theory and design of structural components; tension members, compression members and beams. Connections design of statically determinate systems. Design of structural systems for multi-story buildings using bracing connection. Determination of wind, snow and earthquake loads. Prerequisite: AE 321.

410-472. Steel Structures II**Credit 2(2-2)**

Lecture and laboratory. Multi-story frames; gravity and lateral loads. Design of building frames. Limit design. Three hinged arches. Composite construction.

410-481. Reinforced Concrete Theory and Design**Credit 3(3-0)**

Reinforced concrete theory as applied to building structures. Design of beams, slabs, and columns. Allowable stress and ultimate strength concepts. Bending of reinforced concrete columns. Prerequisite: ME 335 and ME 336.

410-510. Engineering and Construction Management**Credit 2(2-0)**

Introduction to planning and scheduling engineering design projects and construction projects. Manual and automated methods of projecting schedules, estimating manpower requirements and reporting progress. Prerequisite: Upper Junior Status.

410-512. Senior Project**Credit 3(0-4)**

Preparation of final construction documents including calculations, drawings final construction cost estimate and specifications. Prerequisite: Senior Standing.

410-521. Senior Seminar**Credit 1(1-0)**

Preparation of resumes, interviewing techniques, and career alternatives. Review of material included in the Engineer in Training Exam. Prerequisite: Senior Standing.

410-522. Professional Practice**Credit 2(2-0)**

Lecture. Procedures of professional practice, registration, ethics, professional services, contracts, bonds, liens, insurance bidding procedures, supervision, and administration of construction operations, office management. Prerequisite: Upper Junior Status. Architectural Engineering majors only.

410-551. Production Drawings**Credit 3(0-6)**

Laboratory course: Design development drawings and architectural working drawings. Production of small scale general drawings include plans and elevations, large scale detail drawings and schedules. Prerequisite: Senior Standing.

410-561. Foundation and Soil Structures**Credit 3(1-4)**

Lecture and laboratory. Origin and composition of soils structure. Flow of water through soils, capillary and osmotic phenomena. Soil behavior under stress; compressibility; shear strength. Elements of mechanics of soil masses with application to problems of bearing capacity of foundations, earth pressure on retaining walls, and stability of slopes.

410-573. Energy Management for Building**Credit 3(3-0)**

Lecture problems course: Study of renewable and nonrenewable energy sources for buildings, energy estimating methods (manual and automated) optimizing building envelop design, comparative energy requirements for various HVAC systems. Utilization of the solar energy F-chart method, design of efficient lighting and electrical systems. Energy management and control systems (EMCS) waste heat recovery, energy audit procedures for existing buildings, life cycle cost and techniques.

*Advanced Undergraduate Courses***410-601. Advanced Reinforced Concrete****Credit 3(3-0)**

Design and analysis of columns for axial loads, and biaxial bending. One way and two slabs, multi-story building frames, continuous beams, precast joists, footings, retaining walls and prestressed and post tension beam design.

410-602. Advanced Structural Analysis**Credit 3(3-0)**

Matric Algebra. Review of continuous beams, slope deflection, moment distribution, and energy-methods. Flexibility and stiffness methods. Application of computer aided methods to beams, trusses, plane and space frames.

410-610. Airside System Design Concepts**Credit 3(0-0)**

Introduction to fans, duct design methodology, terminal air devices, louvers and dampers. Equipment selection and layout, testing and balancing. Operation and maintenance.

410-611. Hydronic Systems Design**Credit 3(3-0)**

Introduction to centrifugal pumps and pump systems. Air control devices. Cooling tower pumping and piping. Primary-secondary pumping systems. System balancing. Steam heating systems. Chillers.

410-613. Design of Energy Conservation Systems**Credit 3(3-0)**

Utility rate schedules, energy conservation opportunities in lighting, electrical systems HVAC, compressed air, steam generation and distribution, waste heat recovery, thermal energy storage and co-generation.

410-620. Architectural Design IV**Credit 4(0-8)**

Laboratory-lecture course presenting a series of problems for study of space analysis, space organization, form and function. Integration of design and construction methods and the organization of structural components.

410-621. Advanced Architectural Design**Credit 4(1-6)**

Advanced studies in architectural design. Projects deal with various aspects of building design, urban design, and community design in a comprehensive and integrated manner. Prerequisite: AE 620 or Graduate Standing.

410-622. City Planning and Urban Design**Credit 3(1-4)**

Lecture and laboratory course. History of city planning and urban design; general problems of city planning and urban design-architectural space composition. Regional and urban planning; scale of the plan for region and city. Transportation in the city; the city as a human unit. Greenery in the city. Location of the residential areas, industry, business and commerce, etc. Location criteria. Design of the neighborhood unit. Prerequisite: Juniors enrolled in the program of the Transportation Institute and Architectural Engineering majors of Junior classification. Open to practicing design professionals.

DEPARTMENT OF CHEMICAL ENGINEERING
Franklin G. King, Chairman*Undergraduate Courses***470-100. Introduction to Chemical Engineering****Credit 1(1-0)**

Chemical Engineering curriculum, careers in Chemical Engineering, introduction to Chemical Engineering concepts. Also includes an introduction to the digital computer and to FORTRAN programming.

470-110. Introduction to Chemical Engineering Design Credit 2(2-0)

Introduction to Process Synthesis and Design. FORTRAN programming and the application of computers and computer programs to the solution of engineering problems.

470-200. Chemical Process Principles I Credit 3(3-0)

An introduction to the analysis of chemical processes with an emphasis on mass balances. Stoichiometric relationships, ideal and real gas behavior. Corequisites: Chem. 107, Math 132, Phys. 241.

470-210. Chemical Process Principles II Credit 3(3-0)

A continuation of ChE 200 with emphasis on energy balances. Combined mass and energy balances. Introduction to the first law of thermodynamics for open and closed systems. Prerequisite: ChE 200 (with a C or higher). Corequisite: Math 231.

470-220. Chemical Engineering Analysis Credit 3(3-0)

Formulation of unsteady state math models based on mass and energy balances. Simulation of continuous systems in engineering. Use of Laplace transforms to solve engineering problems. Numerical Analysis. Application of numerical methods to the treatment of engineering data and solving problems. Corequisite: ChE 210.

470-300. Transport Operations I Credit 3(3-0)

Application of macroscopic equations to the study of chemical engineering operations involving fluid flow in pipes, through porous media and past immersed bodies, motion of particles in fluids and transportation and metering of fluids. Design of piping networks and fluid flow and metering equipment. Prerequisites: ChE 210 (with a grade of C or higher), Phys 242; Corequisite: Math 331.

470-310. Chemical Engineering Thermodynamics Credit 3(3-0)

Study of thermodynamics principles with special emphasis on chemical process applications. Introduction to the second law; properties of pure chemicals and mixtures; expansion and compression of fluids, heat engines. Study of phase equilibria and chemical reaction equilibria. Prerequisite: ChE 210. Corequisite: Chem 441.

470-320. Transport Operations II Credit 3(3-0)

Derivations of energy balance equations. Applications of energy balance equations to heat transfer operations involving conduction, convection and radiation with emphasis on the macroscopic approach. Design of heat exchange equipment. Prerequisites: ChE 300 (with a C or higher), ChE 310.

470-330. Chemical Engineering Laboratory I Credit 2(2-0)

Laboratory studies of unit operations involving fluid flow and heat transfer. Stress is placed on comparison between theory and experimental results. Quality reporting is stressed. Formal and informal reports, oral presentations and visual aids. Prerequisite: English 101. Corequisite: ChE 320.

470-340. Process Dynamics and Control Credit 3(2.5-0.5)

The course covers the methods for controlling chemical process equipment, including the dynamic response of process equipment and systems. Experimental and simulation methods are stressed in the design of control systems. Modes of control, controller characteristics and control loop design are stressed. Introduction to Computer Control. The laboratory studies include experimentation with various control loops. Prerequisite: ChE 220 or permission of instructor. Corequisites: ChE 320, Math 331.

470-400. Mass Transfer Operations Credit 3(3-0)

Study of stagewise and diffusional separation principles. Quantitative treatment of the design of mass transfer equipment involving equilibrium stage and differential contacting. Operations include distillation, absorption, extraction, drying and humidification. Corequisite: ChE 320.

470-410. Chemical Engineering Laboratory II Credit 2(2-0)

A continuation of ChE 330 with laboratory studies involving heat transfer, mass transfer, and chemical reaction engineering. Open ended studies and independent study projects. Prerequisite: ChE 330. Corequisites: ChE 400, ChE 420.

470-420. Chemical Reaction Engineering Credit 3(3-0)

Fundamentals of chemical kinetics and rate theories. Design of chemical reactors for batch and flow systems; heat transfer effects; non-ideal behavior. Introduction to heterogeneous systems and catalysis. Prerequisite: ChE 320 (with a C or higher), Chem 442.

470-430. Process Design I Credit 3(3-0)

A study of the steps in creating a chemical process design from concept to completion and plant operation. Topics include engineering economy, systems analysis, simulation, process equipment design and ecological considerations. Corequisite: ChE 400.

470-440. Process Design II Credit 3(3-0)

Use of chemical engineering and economics principles in process design. Design of a complete chemical process including literature survey, mass and energy balances, flow diagrams, equipment selection and design, cost and economic analysis. Application of optimization methods and computer simulation in determining optimum selection of process variables. Prerequisites: ChE 400, ChE 420, ChE 430.

470-500. Chemical Engineering Seminar Credit 0(0-0)

Presentation and discussion of selected topics of interest to ChE students and ChE professionals; Ethics; Professionalism; Careers in ChE; Graduate School; AIChE.

470-505. Selected Topics in Chemical Engineering Credit 3(3-0)

An indepth lecture course covering several advanced topics in chemical engineering. Topics will be selected to match student interest and faculty expertise. A specific course description will be available at the beginning of each semester that the course is offered. Prerequisites: Senior standing in Chemical Engineering.

470-510. Independent Study in Chemical Engineering Credit 3(3-0)

Advanced treatment of selected topics in chemical engineering. Independent study subjects are arranged to fit the interests of the student and his/her faculty supervisor. Prerequisite: Senior standing in ChE courses or by special permission.

470-520. Fuels and Petrochemicals Credit 3(3-0)

Combustion, energy content and other basic topics important to fuels. Topics include macromolecular hydrodynamics, surface and colloidal chemistry and structure of polymers, physical and synthetic chemistry of fuels, air pollution, absorption and catalysis and combustion. Prerequisite: Senior standing in ChE courses.

470-525. Fuels and Synfuels Process Design

Credit 3(3-0)

Extraction and processing of petroleum, synfuels, wood, and coal. Key elements of processing may include distillation, refining, fermentation, slurry, chip and power science, and removal of undesirable by-products as water, sulfur, etc. Creation of an industrial operation and processing system. Prerequisite: ChE 520.

470-530. Basic Food Processing Engineering

Credit 3(3-0)

Basic food and processing topics including food preparation operations, slurry flow, processing operations, carcinogens, microbiology and health hazards, toxins, agrichemicals, and residues, fertilizers, pesticides, plant stimulants, diseases and medicines, and their effects on humans. Prerequisite: Senior standing in ChE courses.

470-535. Food Processing Design

Credit 3(3-0)

Design of canning, bottling, and similar food processing operations, production and optimization techniques for basic, prepared, and synthetic foods. Prerequisite: ChE 530.

470-540. Forest Products Engineering

Credit 3(3-0)

Basic chemical and mechanical properties of forest products including pulp and paper, combustion, and mechanics of forest products. Conversion of forest products into lumber, paper, fuels, and foods and others. Prerequisite: Senior standing in ChE courses.

470-545. Forest Product Chemical Design

Credit 3(3-0)

Design of operations in the processing of forest products including design of industrial operations in the manufacture of paper, fuels, foods, furniture and other forest chemicals and products. Prerequisite: ChE 540.

Advanced Undergraduate Courses

400-600. Advanced Process Control

Credit 3(3-0)

The course covers advanced methods for controlling chemical processes: adaptive control, feed forward control, cascade control, multivariable control, multi-loop control, decoupling, and deadtime compensation. Emphasis is placed on computer control; Z-transforms, sampled-data systems; digital controller design. Prerequisite: ChE 340; Senior standing in ChE courses.

470-605. Biochemical Engineering

Credits 3(3-0)

The course covers the application of engineering principles to the design and control of fermentation processes. Biochemical production of industrial chemicals. Immobilized enzyme technology. Biological waste treatment. Mixer design and oxygen transfer in fermentors. Separation of fermentor effluents. Prerequisite: Biology 121; Corequisites: ChE 400, ChE 420.

400-610. Advanced Chemical Engineering Thermodynamics

Credit 3(3-0)

Molecular thermodynamics of fluid phase equilibria, introduction to statistical thermodynamics, thermodynamics of nonequilibrium processes. Prerequisite: ChE 310.

400-620. Advanced Chemical Engineering Analysis

Credit 3(3-0)

Solution of chemical engineering problems by advanced mathematical techniques. Solution of uncoupled and coupled momentum, heat and mass transfer problems. Solution of linearized dynamic equations representing staged operations by matrix analysis. Advanced design and optimization of chemical processes. Prerequisite: All core ChE courses up to and including the seventh semester; Math 331.

470-630. Transport Phenomena

Credit 3(3-0)

A unified approach to momentum, energy, and mass transfer with emphasis on the microscopic approach. Development of the differential transport balances. Applications in solving simple chemical process problems. Prerequisites: ChE 320 (with a C grade or higher), Math 331 or permission of the instructor.

470-650. Interfacial and Membrane Phenomena

Credits 3(3-0)

Fundamental principles of phase interfaces: surface tensions, contact angles and dispersive forces. Study of suspension, emulsions and foams. Applications in wetting, floatation, coating and dyeing. Membrane structure. Membrane transport processes, membrane separation technique. Corequisites: ChE 400.

DEPARTMENT OF ELECTRICAL ENGINEERING
Harold Martin, Chairperson

420-100. Computational Methods I

Credit 3(3-0)

An introduction to problem solving techniques through the study of FORTRAN 77 and PASCAL. Various numerical algorithms will be studied with attention given to flow charting and program documentation. Corequisite: Math 131.

420-101. Introduction to Electrical Engineering

Credit 3(3-0)

Introduction to basic resistive circuit analysis, application of Kirchhoff's Laws, Loop and Nodal Analysis. Thevenin, and Nortons, etc., to resistive circuits with DC sources. Use of the computer and engineering software packages is required. Prerequisite: E.E. 100

420-200. Electric Circuit Analysis

Credit 3(3-0)

Transient and steady state solutions to first and second order linear systems in the time and frequency domains; introduction to time varying and nonlinear systems. Coordinated laboratory exercises. Prerequisite: E.E. 101. Corequisite: Math 231.

420-206. Circuits Laboratory I

Credit 1(0-3)

Proper use of laboratory instrumentation, principles of measurements, experimental verification of electrical circuit laws and theorems, transient and steady state response, frequency response, resonance of systems with linear passive elements. Prerequisite: E.E. 101, Corequisite: E.E. 200.

420-300. Electric Circuit Analysis and Synthesis

Credit 3(3-0)

Periodic function analysis of n'th order linear systems, Fourier Series and Laplace Transform techniques, and introductory synthesis techniques with coordinated laboratory work. Prerequisite: E.E. 200. Corequisite: Math 331.

420-306. Circuits Laboratory II **Credit 1(0-3)**

Analysis of linear networks and signals using frequency domain techniques. Computer and theoretical analysis of networks are compared with laboratory experimental results using actual circuits. Prerequisite: E.E. 200, 206, Corequisite: E.E. 300.

420-320. Electronics I **Credit 3(3-0)**

A study of active devices with emphasis on terminal behavior. Physical electronics, linear and nonlinear modeling. Coordinated laboratory work. Prerequisite: E.E. 200, Corequisite: Math 331.

420-326. Electronics I Laboratory **Credit 1(0-3)**

Design and analysis of semiconductor electronic circuits using discrete active elements. Emphasis is on physical electronics, terminal behavior, small signal modeling, biasing, amplifier design and analysis of frequency response with experimental verification. Prerequisites: E.E. 200 and E.E. 206, Corequisite: Math 331 and E.E. 320.

420-325. Principles of Electromagnetic Waves **Credit 3(3-0)**

Electromagnetic concepts and effects, vector analysis. Corequisite: Math 332, E.E. 300.

420-327. Digital Logic **Credit 2(2-0)**

Study of Boolean algebra; techniques for design and optimization of combinational logic design, flipflops, counters, registers and arithmetic concepts necessary to understand computer logic. Prerequisite: E.E. 200.

420-400. Digital Signals Analysis and Processing **Credit 3(3-0)**

Analysis of system responses to signals using convolution, Fourier integral spectral sampling, correlation, and probabilistic techniques.

420-410. Linear Systems and Control **Credit 3(3-0)**

Introduction to control theory. This includes: control system modeling and representation, features of feedback control systems, state space representation, time domain analysis, stability analysis, root locus, and design compensation. Prerequisites: E.E. 300.

420-420. Power Electronics **Credit 3(3-0)**

This course covers power semiconductor devices, naturally commutating converters A.C. regulators, D.C. switching regulators, static power inverters, and application techniques.

420-427. Introduction to Microprocessors **Credit 3(3-0)**

An introduction to microprocessor hardware and software design assembly language and machine language programming and microprocessor interfacing and applications. Prerequisites: 420-327.

420-430. Power Systems, Energy Conversion and Electric Machinery **Credit 3(3-0)**

Study of the electric power system as an interconnection of energy conversion and transmission devices; electric machinery; energy and power; operation of a power system. Prerequisites: E.E. 300 and E.E. 325.

420-433. Digital Systems Laboratory **Credit 1(0-3)**

Practical experience in the design, construction and analysis of logic circuits. Prerequisites E.E. 327, Corequisite: E.E. 427.

420-436. Power Systems, Energy Conversion and Electric Machinery Laboratory **Credit 1(0-3)**

A study of power circuits and a study of the behavior of motors and generators by laboratory experimentation. Prerequisites: E.E. 300, E.E. 306, E.E. 325, Corequisite: E.E. 430.

420-442. Electrical Engineering Survey **Credit 3(3-0)**

Electronic circuit theory and applications; control of electrical apparatus; electro-chemical processes; electronic analog and digital computer principles. Coordinated laboratory work. Prerequisite: E.E. 200.

420-447. Basic Electrical Engineering I Laboratory **Credit 1(0-3)**

This is a course designed for engineering students with majors other than electrical engineering. Emphasis is on practical experience in the actual design, construction and analysis of basic AC and DC electrical and electronic circuits and writing clear, concise laboratory reports. Prerequisites: Physics 222 and Math 131, Corequisite: E.E. 441.

420-450. Electromagnetic Radiation and Microwave Theory **Credit 3(3-0)**

The basic postulates of electromagnetism; the integral laws of free space; the differential laws in free space; static fields; time varying fields. Prerequisite: E.E. 325.

420-460. Electronics II **Credit 3(3-0)**

A continuation of Electronics I. Principles of semiconductor electronic circuits; rectifiers and filters; amplifiers; feed-back and oscillatory systems. Coordinated laboratory work. Prerequisite: E.E. 320.

420-466. Electronics II Laboratory **Credit 1(0-3)**

Design analysis of semiconductor electronic circuits using discrete and integrated circuits. Emphasis is on design and experimental verification of amplifiers, switching circuits, etc. using linear active devices. Prerequisites: E.E. 320 and E.E. 326. Corequisite: E.E. 460.

420-470. Properties of Materials for Electrical Engineering **Credit 3(3-0)**

The effects of atomic, molecular, and crystal structure on the electrical and physical properties of conducting, insulating and semiconductor materials used in electrical engineering. Prerequisite: E.E. 325.

*Advanced Undergraduate***420-602. Semiconductor Theory & Devices** **Credit 3(3-0)**

A study of the phenomena of solid-state conduction and devices using band models; excess carriers in semiconductors; p-n junctions and devices; bipolar junction transistors field effect transistors; integrated circuits. Prerequisites: 227-406 and 420-460.

420-614. Integrated Circuit Fabrication Methods **Credit 3(3-0)**

Device technology for the fabrication of silicon integrated circuits. Techniques will be applicable to bipolar and MOS transistor structures, LSI and VLSI circuits. Oxidation, diffusion, epitaxy and ion implantation processes will be studied. Limits on device design and performance; compound semiconductor device technology. Prerequisite: 420-602 or consent of instructor.

420-615. Silicon Device Fabrication Laboratory

Credit 2(0-2)

Laboratory experiments in the fabrication of silicon devices. P-N junctions diodes, metal-oxide semiconductor (MOS) capacitors and (MOS) field effect transistors will be fabricated. Oxidation, diffusion and photolithographic techniques will be presented. Prerequisite: 420-614 or consent of instructor.

420-616. Microprocessor Software Design

Credit 3(3-0)

An introduction to microprocessor systems with emphasis on software design. A popular microprocessor system will be used as the basis for the course. Programming techniques that lead to error free programs using assembly language will be emphasized. Prerequisite: 420-427.

420-617. Microprocessor Hardware Design

Credit 3(3-0)

Microprocessor architectures and supporting components RAMS, ROMS, PORTS, timers, etc. are studied. I/O structures in microcomputers, interrupts, DMA operations and interfacing problems are also addressed. Emphasis will be placed on microcomputer development from the device to the system level. Prerequisite: 420-616.

420-619. Microprocessor Laboratory

Credit 2(0-2)

Experiments are geared to provide students with practical understanding of microprocessor systems design techniques, including memory, I/O interfacing interrupts and DMA operations. A student project provides an opportunity for students to gain experience in using the microcomputer in typical applications in process control, test equipment communication, etc. Prerequisite: 420-616, Corequisite: 420-617 or consent of instructor.

420-627. Switching Theory

Credit 3(3-0)

A study of design techniques for systems at the gate and flip flop level with applications to both combinational and sequential logic circuits. Functional minimization and state minimization algorithms, timing problems, and state assignment are discussed. MSI and LSI circuits are also discussed. Prerequisite: 420-427.

420-629. VLSI Design

Credit 3(3-0)

A study of the principles for designing large scale integrated systems. Emphasis is placed upon implementation of combinational logic and sequential machines as regular structures such as PLA's and iterative networks. CAD techniques and circuit simulation methods are discussed. MOS devices and their properties are also studied. Prerequisite: 420-627.

420-630. VLSI Design Lab

Credit 2(0-2)

To familiarize the student with various CAD tools that are essential for integrated circuit design and verification. These tools include geometric pattern generators, design rule checkers, circuit simulators, and PLA generators. A student project is part of the laboratory requirements. Prerequisite: E.E. 627, Corequisite: E.E. 629.

420-633. Digital Electronics

Credit 3(3-0)

Families of logic; resistor-transistor logic (RTL), integrated-injection logic (IIL), diode-transistor logic (DTL), transistor-transistor logic (TTL), emittercoupled logic (ECL), MOS gates and CMOS gates. Basic digital structures; flipflops, registers and counters, interface between digital and analog signals. Prerequisite: 420-460.

420-636. Power System Analysis I

Credit 3(3-0)

General background in power systems transmission line parameters, current voltage regulations on a transmission line, system modeling, network calculations, load flow studies and control. Prerequisite: EE 430.

420-637. Power Systems Analysis II

Credit 3(3-0)

Economic operation of power systems, fault studies, symmetrical components, and power system protection. Prerequisite: E.E. 430.

420-642. Solid State Energy Conversion

Credit 3(3-0)

Review of semi-conductor and solar radiation principles. Operation and design of solid state thermoelectric generators. Operation and design of solar cells. Use of solar collectors and solar cells in terrestrial applications. Prerequisites: 227-406 and 420-460 or consent of instructor.

420-649. Modulation Theory & Communication Systems

Credit 3(3-0)

Fundamental principles of modulation theory applied to amplitude, single and double side band, frequency, pulse amplitude, pulse duration, pulse code and multiplexing modulation methods and their application to communication systems are studied. Random signals, noise considerations and probability theory are introduced. Prerequisites: 420-300, 420-320, and 225-500.

420-650. Digital Signal Processing I

Credit 3(3-0)

Develop working knowledge of basic signal processing functions such as digital filtering, spectral analysis, and detection/post detection processing. Methods of generating the coefficients of the digital filters will be derived. Alternative structures for filters such as indefinite impulse response and finite impulse response will be compared. The effect of finite register length will be covered. Prerequisites: 420-400 and 225-500 or consent of instructor.

420-651. Digital Signal Processing Laboratory

Credit 2(0-3)

Experiments and students projects related to the practical application of digital signal processing techniques for data acquisition, digital filtering, control, spectral analysis, communications, etc. Prerequisite: 420-400, Corequisite: 420-650.

420-656. Probability & Random Processing

Credit 3(3-0)

Sample space and events, conditional probabilities, independent events, Bayes' formula, discrete random variable, continuous random variable, expectation of random variable, joint distribution, conditional expectation, Markov chains, stationary processes, ergodicity, correlation and power spectrum of stationary processes. Poisson processes. Gaussian processes. Prerequisite: 420-400.

420-660. Selected Topics in Engineering

Credit Var. (1-3)

Selected engineering topics of interest to students and faculty. The topics will be selected before the beginning of the course and will be pertinent to the programs of the students enrolled. Prerequisite: consent of instructor.

420-666. Special Projects

Credit Var. (1-3)

Study arranged on a special engineering topic of interest to student and faculty member, who will act as advisor. Topics may be analytical and/or experimental and encourage independent study. Prerequisite: consent of instructor.

420-668. Automatic Control Theory **Credit Var. (1-3)**

The automatic control problem; review of operational calculus; state and transient solutions of feedback control systems; types of servo-mechanisms and control systems; design principles. Prerequisite: 420-400 or equivalent.

420-672. Analog Electronics **Credit 3(3-0)**

Circuits and systems of linear electronics studied. Design techniques for linear integrated circuits technology are emphasized. Core topics include: Operational amplifiers, A/D and D/A converters, function generator and voltage regulators. Selected topics on: Feedback amplifier, oscillators, PLL (Phase Locked Loop), consumer electronics, noise. Prerequisite: 420-460.

420-674. Network Synthesis **Credit 3(3-0)**

Use of positive real functions in the synthesis of passive networks. Properties of second order systems and their realization; control of poles and zeros through dependent sources. Synthesis and analysis of active and passive filters. Prerequisites: 420-300, 420-460.

420-678. Projects in Electronic Network & Systems **Credit 3(3-0)**

Laboratory of special interest to students in electronic network and systems; students will be required to do projects emphasizing actual circuit construction and systems integration. Corequisite 420-633.

DEPARTMENT OF INDUSTRIAL ENGINEERING
Arup Mallik, Chairperson

Undergraduate

430-101. Interface to Industrial Engineering Lecture **Credit 2(2-0)**

An introductory course for industrial engineering majors. Engineering problem formations and applications of engineering mathematics.

430-102. Computer Programming for IE **Credit 3(3-0)**

An introductory course for industrial engineering majors. Use of digital computers as computational aids in the solution of engineering problems. Introduction to FORTRAN and BASIC programming languages.

430-150. Introduction to Industrial Engineering **Credit 3(3-0)**

The historical development of engineering and industrial engineering. Introduction to production systems design and control, operations research and systems. Prerequisite: I.E. 101. Corequisite: Math 131.

430-210. Computational Methods in Engineering **Credit 2(2-0)**

In-depth study of digital computer programming languages, particularly FORTRAN. The use of computer programs for the solution of engineering problems and numerical analyses. Prerequisite: I.E. 102 or equivalent. Corequisite: Math 131.

430-320. Engineering Statistics **Credit 3(3-0)**

Engineering statistics and their application to engineering problems. Central tendency, variability, probability, distributions, correlation, regression, sampling and tests of significance. Prerequisite: I.E. 101. Corequisite: Math 132.

430-410. Methods Engineering **Credit 3(2-2)**

Introduction to the design process and its application to methods design. Motion study, work measurement and introduction to Methods-Time Measurement System. Administration of methods engineering function. Prerequisite: I.E. 150.

430-460. Engineering Economic Analysis **Credit 2(2-0)**

Interest calculations. Methods of comparative economic analysis such as annual cost, present worth and rate of return on investment. Depreciation, replacement, tax effects and decision tree analysis. This course is designed for majors in engineering other than industrial engineering. Prerequisite: Math 131.

430-465. Engineering Economy **Credit 3(3-0)**

The development of principles required in making economic and financial decisions. Topics include: General economic principles, interest and interest formulas, economic decisions criteria, depreciation methods, tax considerations and cost accounting, economic analysis of the selection and replacement of structures, equipment, processes and methods. Prerequisite: I.E. 150, Math 131.

430-480. Operations Research I **Credit 3(3-0)**

Operations research methodology. Linear programming cost models, inventory, queueing theory and dynamic programming. Prerequisite: I.E. 320 or equivalent, I.E. 150.

430-510. Quality Control **Credit 3(3-0)**

Statistical analysis of quality in manufacturing. Acceptance sampling and control charts. Prerequisite: I.E. 320.

430-515. Introduction to Stochastic Processes and Simulation **Credit 3(3-0)**

Basic concepts of Stochastic Processes and Simulation. Poisson Process, Markov Process, Inventory, Reliability and Queueing models. General principles of discrete event simulation modeling using FORTRAN and BASIC. Methods of random number generation, model validation and result interpretation. Applications emphasized. Prerequisite: IE 480.

430-530. Production Control **Credit 4(4-0)**

Organization and functions of production control. Forecasting techniques. Inventory analysis and modeling project planning techniques. Prerequisite: I.E. 320. Corequisite: I.E. 480.

430-550. Facilities Planning and Design **Credit 3(2-2)**

Plant location methods, total process analysis, process integration, materials handling analysis, and traditional and computerized plant layout methodologies. Prerequisite: I.E. 410, 480. Corequisite: I.E. 530.

430-555. Design Projects in Industrial Engineering **Credit 3(0-6)**

Group or individual design projects for industrial engineering students to analyze and solve practical industrial engineering problems involving techniques such as methods improvement, quality control, production control and scheduling, economic analysis, and facilities design. Prerequisite: I.E. 550.

430-565. Industrial Ergonomics **Credit 3(3-0)**

Introduction to the functional processes of human systems that pertain to an understanding of the limitations of humans in man-machine systems. Industrial Ergonomics is the study of physiology, ergonomics and safety in the context of measuring and predicting human performance. Principles are applied through design problems and laboratory demonstrations. Prerequisite: IE 320, IE 410.

430-615. Industrial Simulation Credit 3(3-0)

Study of the GPSS (i.e., General Purpose Simulation System) language including a term project. Review of other simulation languages, such as: 1) Industrial Dynamics, 2) GSMP, 3) GASP, and 4) SIMSCRIP. Prerequisites: I.E. 210 and 320 or consent of the instructor.

430-621. Engineering Cost Control and Analysis Credit 3(3-0)

Emphasis on utilization of cost data and reports by management control over industrial operation. This course is designed to emphasize use of accounting data internally by engineers in directing the affairs of organizations, both business and non-business. Prerequisite: I.E. 460 or I.E. 465 or equivalent.

430-624. Production Systems Credit 3(2-1)

Study of modern production and assembly methods. Techniques for deciding the most appropriate production method for new product. Manufacturing resource planning, numerical control technology, industrial robots, computer-aided manufacturing, group technology, computer-aided process planning and other automated manufacturing methods. Computer integrated manufacturing systems.

430-625. Information Systems Credit 3(3-0)

Systems concepts. Methodology of systems analysis and design. Information systems analysis. Design of information systems, file structures and data base concepts.

430-626. Systems Analysis and Design Credit 3(3-0)

Analysis and development of systems, including management requirements, decision making levels, economic justification, and implementation. The computer is considered as a tool in analysis and design as well as one component in the total system. Prerequisite: Graduate standing in engineering.

430-632. Robotic Systems and Applications Credit 3(2-1)

Study of robotics technology, applications and justification. Principal topics: anatomy, characteristics, end effectors, sensors, vision systems, programming and application criteria of industrial robots. Robotic systems design and analysis.

430-640. Intermediate Engineering Economy Credit 3(3-0)

Review of traditional methods. Replacement analysis. Capital planning and budgeting. Risk and uncertainty methodologies. Decision tree analysis. Multiple criteria analysis. Prerequisite: I.E. 320 and 460 or consent of the instructor.

430-649. A Survey of Operations Research Methodologies Credit 3(3-0)

Operations research models such as linear programming, inventory and queueing theory are derived and applications presented. Prerequisite: Math 132 or consent of the instructor.

430-650. Operations Research Credit 3(3-0)

Quantitative management decision making formulation of deterministic models of processes with orientation to optimization by use of digital computers. Prerequisite: I.E. 320 and 480 or equivalent.

430-658. Project Management and Scheduling Credit 3(3-0)

Project scheduling with CPM and PERT. Scheduling within resource constraint. Cost scheduling. Cost estimation with emphasis on learning curves. Assembly line balancing. Introduction to theory of sequencing/scheduling with applications of priority rules and Heuristic Methods. Prerequisite: I.E. 320 or consent of the instructor.

430-660. Selected Topics in Engineering Credit Variable (1-3)

Selected engineering topics of interest to students and faculty. The topics will be selected before the beginning of the course and will be pertinent to the programs of the students enrolled. Prerequisite: consent of the instructor.

430-662. Reliability Credit 3(3-0)

Review of probability theory; combinatorial reliability; catastrophic-failure models; system reliability; reliability improvement; statistical parameter and interval estimation for reliability functions. Prerequisite: I.E. 320 or consent of the instructor.

430-664. Safety Engineering Credit 3(3-0)

History; legislation; engineering safety analysis; OSHA (i.e., Occupational Safety and Health Act); Safety program organization and procedures. Prerequisite: Senior standing in engineering or consent of the instructor.

430-665. Man/Machine Systems Credit 3(3-0)

Human engineering approach to the analysis of systems development cycle. Function allocation between man and machine. Design implications of capabilities and limitations of human beings. Design of controls and displays. Design of individual and multi-man-machine work areas. Engineering anthropology. Maintainability design.

430-666. Special Projects Credit Variable (1-3)

Study arranged on a special engineering topic of interest to student and faculty member, who will act as advisor. Topics may be analytical and/or experimental and encourage independent study. Prerequisite: consent of the instructor.

430-678. Engineering Management Credit 3(3-0)

A brief review of engineering management history and its relationship to industrial engineering, operations research, management science and technical discipline's planning, organizing, staffing, controlling and directing an engineering environment. Prerequisites: Senior standing or consent of instructor.

DEPARTMENT OF MECHANICAL ENGINEERING

D.Y. Goswami, Acting Chairperson

Office: 618 McNair Hall

Course Description — Undergraduate Courses

440-100. Mechanical Engineering Orientation and Analysis Credit 2(2-0)

Introduction to Mechanical Engineering, engineering problem solving, representation of technical information, use of hand held calculators, introduction to digital computers and the BASIC programming language. Use of computer plotting routines for graphical representation. Prerequisite: Freshman standing.

- 440-103. Graphics in Engineering** Credit 2(0-0)
An introductory engineering graphics course covering the following topics: Fundamentals of engineering graphics, principles of orthogonal projection, sketching for technical design, dimensioning, sectional and auxiliary views, detail and assembly drawings, introduction to computer graphics. Prerequisite: Freshman standing.
- 440-105. Computational Methods in Mechanical Engineering** Credit 2(2-0)
Introductory use of the digital computer to solve mechanical engineering problems. FORTRAN programming will be emphasized. Prerequisite: M.E. 100.
- 440-210. Numerical Methods in Mechanical Engineering** Credit 2(2-0)
Numerical techniques for Mechanical Engineering analysis including numerical integration, differentiation, interpolation, root finding, matrix manipulation and solution of linear simultaneous equations. Prerequisites: M.E. 105 and Math 131.
- 440-226. Manufacturing Processes** Credit 2(2-0)
A quantitative study of the techniques and applications of metal removal and forming operations; casting and molding of metals and plastics; joining and assembly techniques. Case studies involving problems in re-design for producibility. Prerequisites: M.E. 100 and M.E. 103 or equivalent.
- 440-236. Manufacturing Processes Laboratory** Credit 1(0-2)
Hands-on experiences in the use of measuring and inspection instruments, basic machine tools, and welding equipment. Introductory exercises in both manual and computer assisted CNC programming. Corequisite: M.E. 226.
- 440-335. Mechanics I, Statics** Credit 3(3-0)
Basic vector concepts of force, moment of a force; analytical and graphical techniques in the analyses of force and moment; conditions of equilibrium in frames, trusses, machine members under static loads; law of friction; distributed forces, determination of centroid, mass center, area and mass moment of inertia. Prerequisite: Math 131. Physics 241.
- 440-336. Strength of Materials** Credit 3(3-0)
Analysis of stress and strain; stress-stress relations; applications; torsional and flexural loadings; flexural deflections; combined loading; columns. Prerequisite: M.E. 335.
- 440-337. Mechanics II, Dynamics** Credit 3(3-0)
Introduction to the kinematics of particles and rigid bodies in translation, rotation and plane motion; introduction to the concepts underlying the work-energy principles and impact-momentum principles. Prerequisite: M.E. 335, Math 132.
- 440-346. Material Testing Laboratory** Credit 1(0-2)
Experimental work leading to the study of: behavior of engineering materials under axial and shear loads; bending loads; combined loads; fatigue and impact loads; time-dependent deformation of materials. Corequisite: M.E. 336.
- 440-360. Materials Science** Credit 3(3-0)
Fundamentals nature of materials, physical, mechanical and chemical characteristics, atomic arrangements and atomic bonding; phase diagrams; properties and engineering requirements of materials; testing and examination, review and selection of materials for specific use. Prerequisite: Chem. 101.
- 440-416. Fluid Mechanics** Credit 3(3-0)
Static and dynamic behavior of fluids; applications to fluid machinery, jet propulsion and instrumentation; dimensional analysis and similitude. Prerequisite: M.E. 337, Math 231.
- 440-426. Fluid Mechanics Laboratory** Credit 1(0-2)
Experimental verification of principles of fluid mechanics; performance testing of pipelines, turbines, fans and pumps, wind tunnel testing of airfoils for drag and lift. Corequisite: M.E. 416.
- 440-440. Kinematics** Credit 3(2-2)
This course emphasizes the kinematic issues in the design of mechanisms. Mathematical, graphical and computer methods are used for synthesis and analysis of linkages, cams and gears trains. Project work is assigned to demonstrate the utility of these methods. Prerequisite: M.E. 337 and M.E. 210.
- 440-441. Thermodynamics I** Credit 3(3-0)
Thermodynamic properties of substances. Development of the first and second laws on a macroscopic system basis. Application to thermodynamic processes involving ideal and real gases. Prerequisites: Math 231, Chem. 101, and Physics 242.
- 440-442. Thermodynamics II** Credit 3(3-0)
Applications of thermodynamics principles to real systems. Gaseous mixtures, psychrometrics, combustion, power and refrigeration cycles. Prerequisite: M.E. 441.
- 440-444. Undergraduate Projects** Credit Variable (1-3)
Study arranged on engineering topics of interest to student. A faculty member will serve as project advisor. Topics may include analytical and/or experimental work and encourages independent study. Prerequisite: Permission of Department and consent of faculty member as advisor.
- 440-474. Engineering Design** Credit 3(2-2)
Techniques of engineering design. Lectures cover the design process, project planning, codes and standards, product liability, professional ethics, simulation, optimization and technical writing. Individual and group projects are assigned to illustrate various aspects of the design process. Prerequisites: ME 210, M.E. 226, M.E. 336.
- 440-540. Dynamics of Mechanical Engineering Systems** Credit 3(2-2)
A unified treatment of mechanical, fluid, and thermal dynamic systems. Emphasis is placed upon the physical characteristics of the systems, mathematical model formulation, exercise of models through modern computational techniques, and correlation of model behavior with that of existing systems. The synthesis and design of systems through model manipulation is covered. Prerequisites: M.E. 562, 442, 440, and E.E. 442.
- 440-544. Special Topics** Credit Variable (1-3)
A senior level course on topics not covered in other mechanical engineering courses. There is to be a title specified for the course, which indicates the contents. The students records will carry both course number and name. This course will satisfy the requirements for a Technical Elective, and approval of the syllabus and other course details must be secured from the department curriculum committee.

440-560. Modern Engineering Materials Credit 3(3-0)

Role of materials in engineering; properties of materials; nonferrous and ferrous systems and applications; heat treatment and strengthening mechanisms; various polymeric, ceramic and composite materials and their applications; failure theories; project work involving selection and design with various material systems. Prerequisites: M.E. 226 M.E. 360.

440-562. Heat Transfer Credit 4(3-2)

This course covers the fundamentals of heat conduction, convection, radiation, boiling and condensation, and heat exchangers; computer-oriented problems and open-end design projects are an integral part of the course. Students are introduced to thermal design through individual and group projects assigned in the design laboratory portion of the course. Prerequisites: M.E. 416, M.E. 441, Math. 332.

440-563. Energy Conversion System Design Credit 3(3-0)

Design consideration in steam power systems, internal combustion power systems, refrigeration and heat pump systems, overview of direct energy conversion device. Power system design project work. Prerequisites: M.E. 416, M.E. 442.

440-564. Machine Design I Credit 3(2-2)

Design of machine elements concentrating on static and fatigue strength. Project work is assigned to demonstrate the applications of these principles. Prerequisites: M.E. 440, M.E. 474.

440-565. Machine Design II Credit 3(2-2)

Applications of engineering design principles to machine elements. Lectures cover design of basic mechanical elements, computer aided design and the interaction between design, materials and manufacturing processes. Project work emphasizes design for performance, reliability, cost and manufacturability. Prerequisite: M.E. 564.

440-566. Design of Thermal Systems Credit 3(3-0)

Selection of components for fluid and energy processing systems to meet system performance requirements, computer-aided thermal design; simulation and optimization techniques and investment economics. Design project are assigned to demonstrate application of these topics. Prerequisites: M.E. 562, I.E. 460.

440-567. Environmental Control Credit 3(3-0)

Principles of heating and air conditioning and their applications to design of environmental control systems; determination of building heating and cooling loads, principal equipment, layout and controls are discussed for various types of systems. Prerequisites: M.E. 442 and 562.

440-568. Gas Dynamics Credit 3(3-0)

Principles of one-dimensional compressible fluid flow. Normal shocks. Flow with friction, heating and cooling. Introduction to two-dimensional flows. Experimental work in fluid flow. Prerequisites: M.E. 416 and 441.

440-569. Engineering Materials Laboratory Credit 1(0-2)

Laboratory exercises covering the following topics: metallographic techniques, macro- and micro structures, heat treatment, mechanical properties of metals, polymers, ceramics and composites, fracture surface and micro chemical analysis of various engineering materials. Corequisite: M.E. 560.

440-570. Internal Combustion Engines Credit 3(2-2)

Fundamental principle of spark-ignition and compression-ignition engines; the combustion phenomena; the effect of fuel-air mixture; design of components of an internal combustion engine; testing and performance curves; design project. Prerequisite: M.E. 440 and 442.

440-571. Turbomachinery Credit 3(3-0)

The Cascade theory, applied to turbomachines; impulse and reaction turbines; compressible fluid dynamics, gas turbine principle; pumps, compressors and blowers; design of turbomachine elements, project work. Prerequisites: M.E. 416 and 442.

440-572. Mechanical Engineering Seminar I Credit 1(0-2)

Reports and discussions on special topics in mechanical engineering and related fields. Prerequisite: Senior standing in mechanical engineering.

440-573. Mechanical Engineering Seminar II Credit 1(0-2)

Continuation of Mechanical Engineering 572. Prerequisite: Senior standing in Mechanical Engineering.

440-574. Mechanical Systems Design Credit 4(2-4)

Comprehensive group projects involving design of engineering systems with such constraints as performance, time, budget, safety, manufacturability and liability. Projects are selected from suggestions by faculty and local industry. Lectures cover design techniques, decision and optimization and computer aided engineering and report preparation. Prerequisite: M.E. 560, M.E. 562, M.E. 564, E.E. 442, Corequisite: M.E. 565.

440-575. Solar Energy Fundamentals and Design Credit 3(3-0)

Characterization of solar radiation at the earth's surface. Discussion and analysis of solar collectors of both flat plate and concentrating types, storage systems, distribution systems and controls. System sizing, design and economic analysis for space heating, water heating and industrial process heat. Prerequisite: M.E. 562.

440-579. Thermal Science Laboratory Credit 1(0-2)

Experimental work in measurement techniques for pressure, temperature and velocity. Experiments in calorimetry, refrigeration, free and forced convection, conduction and radiation heat transfer. Corequisite: ME 562.

440-612. Modern Composite Materials Credit 3(3-0)

Basic concepts of micromechanics and laminate theory are introduced. Strength and failure are studied and temperature and humidity effects are analyzed. Structural components are designed to replace isotropic materials with composites. Special emphasis is placed on developing a computer code for design of composite laminates. Prerequisites: M.E. 210, M.E. 336 or equivalent.

440-614. Mechanicals of Engineering Modeling Credit 3(3-0)

Engineering modeling techniques including time dependent integration simulation models of systems, finite difference and finite element methods in mechanics. Prerequisites: 430-210, 440-336, 225-332 or equivalent.

440-619. Computer Aided Graphics and Design Credit 3(3-0)

This course covers computer graphics and design principles. Applications of various graphics and computational tools for the design of mechanical systems will be emphasized and discussed. Individual and group design projects will be given to illustrate the applications of these techniques to real problems. Prerequisites: M.E. 210, M.E. 440, M.E. 564.

440-646. Advanced Manufacturing Processes Credit 3(3-0)

Theory, application, and design considerations for forming and machining. Machines and Tooling in Modern Manufacturing Processes. Dimensional and Tolerance Analysis. Control of Workpiece and tool. Projects in the design of molds, dies, presses, jigs and fixtures and automated machinery. Prerequisites: M.E. 226 or equivalent, M.E. 564, Math 231.

440-647. Advanced Mechanism Design Credit 3(3-0)

Advanced synthesis techniques; kineto-static and dynamic issues in design of mechanism. Use of digital simulations for design of mechanisms. Design projects are assigned to illustrate the applications of these techniques. Prerequisite: ME 440.

440-650. Mechanical Properties and Structure of Solids Credit 3(3-0)

An examination of the elastic and plastic behavior of matter in relation to its structure, both macroscopic and microscopic. Major representative classes of materials to be examined are thermoplastic materials, elastomers, glasses, ceramics, metals, and composites. Prerequisites: 440-560 or equivalent.

DEPARTMENT OF CIVIL ENGINEERING
Kenneth H. Murray, Chairperson

Undergraduate Courses

450-101. Introduction to Civil Engineering Credit 2(2-0)

An introduction to the profession of Civil Engineering, engineering problem solving, units, conversion of units, engineering concepts, Civil Engineering Curriculum Options, engineering registration and practice, careers outlook, and seminars by practicing Civil Engineers on timely topics.

450-200. Computer Application and Graphics in Civil Engineering I Credit 3(2-2)

Introduction to computer applications in Civil Engineering using both student generated and commercial software. FORTRAN will be emphasized.

450-202. Computer Applications and Graphics in Civil Engineering II Credit 2(1-2)

CAD/CAM tools in Civil Engineering: Graphics, grading, structures, excavations, databases, inventories, scheduling and other computer-based concepts. Prerequisite: CE 200.

450-204. Surveying Credit 2(1-3)

Plane surveying, including the use of surveying instruments. Theory of measurements and sources of error. Traversing and stadia measurements. Differential and profile leveling, topographic mapping, introduction to earthwork surveys. Prerequisite: Math 131.

450-310. Environmental Engineering Credit 2(2-0)

Introduction to environmental pollution and pollution control. Topics include: Basic principles of microbiology; physical, chemical and microbiological characterization of water and wastewater; natural water purification process; air pollution control; and solid waste management. Prerequisite: Junior Standing. Corequisite: CE 311.

450-311. Environmental Engineering Laboratory Credit 1(0-3)

Selected experiments on the measurement of environmental pollutants. Topics include: Use of microscope, Gram stain, coliform analysis, pH, alkalinity, hardness, DO, BOD, and control of microorganisms. Corequisite: CE 310.

450-320. Geotechnical Engineering I Credit 2(2-0)

Soil properties and mechanics related to engineering behavior of soils. Includes soil identification, classification, index properties, effective stress concepts, settlement analysis, evaluation of shear strength and bearing capacity, and fundamentals of foundation selection and design. Prerequisite: Junior Standing. Corequisite: CE 321.

450-321. Geotechnical Engineering Laboratory Credit 1(0-3)

Laboratory experiences in soil identification, classification, and indexing. Laboratory evaluation of shear and bearing strength of soils. Corequisite: CE 320.

450-330. Construction Materials Credit 2(2-0)

Manufacture and properties of mineral and bituminous cements and mineral aggregates. Mechanical properties of Portland cement concrete, bituminous concrete, masonry units and timber products. Materials testing. Prerequisite: Sophomore Standing in CE. Corequisite: CE 331.

450-331. Construction Materials Laboratory Credit 1(0-3)

Introduction to testing techniques for construction materials including metals, concrete, wood and asphalt. Corequisite: CE 330.

450-340. Theory of Structures I Credit 3(3-0)

Analysis of internal forces of statically determinate trusses, beams and framed structures. Analysis of deformations by methods of virtual work and conjugate beam. Introduction to indeterminate structural analysis of trusses, beams and rigid frames by force and displacement methods and qualitative influence lines. Prerequisite: ME 336.

450-342. Reinforced Concrete Design Credit 3(3-0)

Behavior and design of reinforced concrete in structural systems using beams, slabs, and columns. Ultimate strength concepts according to ACI 318 Code are used. Prerequisites: CE 340 and ME 336.

450-344. Structural Design in Steel Credit 3(3-0)

Design of steel structural systems using AISC. Covered are tension members, beams, columns, connections and plate girders. Elastic design principles are used with an introduction to plastic design. Prerequisite: CE 340.

450-346. Structural Design in Wood Credit 3(3-0)

Design of structural systems in wood using current codes. Covered are tension members, beams, columns trusses, and fasteners using dimensional lumber, glued-laminated products and plywood. Prerequisite: CE 340.

450-350. Transportation Engineering I Credit 3(3-0)

Analysis and design of integrated transportation systems including function, influence characteristics, and operation. Selection of appropriate mode of transportation considering power requirements, speed, stopping, capacity, economics, route location and future technological developments. Prerequisite: CE 204 and Junior Standing in CE.

450-360. Hydrology Credit 3(3-0)

The study of hydrologic cycle with emphasis on the application of surface and subsurface hydrology in water systems. Topics include: hydrologic cycle, rainfall-runoff relationships, unit hydrograph analysis, stream flow, flood routing, aquifer characteristics, and frequency analysis of hydrologic data. Prerequisite: Junior Standing.

450-400. Civil Engineering Systems Credit 3(2-2)

Topics in linear and non-linear civil engineering systems; hereditary and feedback couplings; continuous, discrete, random and stochastic inputs; system stability; reliability; optimization; and the ultra-stable autonomous system. Student participation individually or collectively, in the design of civil engineering systems. Prerequisite: Senior Standing.

450-410. Water and Wastewater Engineering Credit 3(3-0)

The study of water and wastewater engineering systems. Topics include the analysis and design of water distribution systems, storm sewer systems, sanitary sewer systems, pumping station, and physical, chemical and biological treatment processes in water and wastewater treatment systems. Prerequisites: CE 310 and CE 311.

450-416. Solid Waste Management Credit 3(3-0)

The study of the collection, storage, transport and disposal of solid wastes. Examination of various engineering alternatives with appropriate consideration for air and water pollution control and land reclamation. Prerequisite: Senior Standing.

450-420. Geotechnical Engineering II Credit 3(3-0)

A continuation of CE 320 with emphasis of soil mineralogy and the physical-chemical properties of soils and their application to an understanding of permeability, consolidation, shear strength, and compaction. Design considerations of soil-structure interaction are discussed. Prerequisite: CE 320.

450-440. Theory of Structures II Credit 3(3-0)

A rigorous treatment of indeterminate structural analysis. Coverage includes of indeterminate analysis, Maxwell-Betti reciprocal theorem, qualitative influence lines, and introduction to the finite element method. Prerequisite: CE 340.

450-450. Transportation Engineering II Credit 3(3-0)

Design of transportation systems from planning stage through construction and operation. Legal, social and engineering aspects of transportation system are considered. Prerequisite: CE 350.

450-452. Bituminous Materials and Design Mixture Credit 2(2-0)

Design of bituminous mixtures including the influence of manufacturing techniques, aggregates, temperature, and other variables. Significance of test methods, specifications, and construction practices. Prerequisites: CE 330 and CE 331. Corequisite: CE 453.

450-453. Bituminous Materials Laboratory Credit 1(0-3)

Laboratory methods for testing bituminous materials and mixtures. Corequisite: CE 452.

450-454. Portland Cement Materials and Mix Design Credit 2(2-0)

Design of Portland cement mixes including the influence of aggregates, sands, cements, admixtures, and environmental factors. Significance of test methods, specifications and construction practice. Prerequisites: CE 330 and CE 331. Corequisite: CE 455.

450-455. Portland Cement Materials Laboratory Credit 1(0-3)

Laboratory methods for testing Portland cement materials, mixes and admixtures. Corequisite: CE 454.

450-460. Water Resources Engineering Credit 3(3-0)

Application of hydrologic and hydraulic principles in the analysis and design of water resources systems for the use, control and improvement of water resources. Topics include hydraulic structures, system economics, water law, irrigation, hydroelectric power, navigation, flood control and water resources planning. Prerequisite: CE 360.

450-464. Applied Hydraulics Credit 3(3-0)

The study of the hydraulics of pressure conduits and open channel flow. Topics include: Measurement of flow; analysis of flow in pressure distribution systems; open channel flow; reservoirs and distribution systems storage; well hydraulics; and flow through porous media. Prerequisite: Senior Standing.

450-480. Construction Engineering Credit 3(3-0)

Introduction to construction engineering emphasizing heavy and highway construction. Organization of construction industry; construction equipment, methods, and management; safety and environmental health in construction; project planning and scheduling. Prerequisite: Senior Standing.

450-482. Construction Project Credit 3(1-4)

Integrated approach by student teams to design, estimating, planning, scheduling and management of construction projects. Prerequisite: CE 480.

450-522. Foundation Design Credit 3(3-0)

The design of foundations for structural systems using geotechnical analysis and subsurface explorations. Designs considered include shallow and deep foundations, retaining structures, earth slope stability systems and soil and site improvements. Prerequisite: CE 320.

450-452. Bituminous Materials and Design Mixture Credit 2(2-0)

Design of bituminous mixtures including the influence of manufacturing techniques, aggregates, temperature, and other variables. Significance of test methods, specifications, and construction practices. Prerequisites: CE 330 and CE 331. Corequisite: CE 453.

450-453. Bituminous Materials Laboratory Credit 1(0-3)

Laboratory methods for testing bituminous materials and mixtures. Corequisite: CE 452.

450-454. Portland Cement Materials and Mix Design Credit 2(2-0)

Design of Portland cement mixes including the influence of aggregates, sands, cements, admixtures, and environmental factors. Significance of test methods, specifications and construction practice. Prerequisites: CE 330 and CE 331. Corequisite: CE 455.

450-455. Portland Cement Materials Laboratory Credit 1(0-3)

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The design of foundations for structural systems using geotechnical analysis and subsurface explorations. Designs considered include shallow and deep foundations, retaining structures, earth slope stability systems and soil and site improvements. Prerequisite: CE 320.

Advanced Undergraduate

450-610. Water and Wastewater Analysis Credit 3(2-3)

Laboratory and field methods for the measurement and analysis of water quality parameters. Basic chemical and microbiological techniques are introduced. Prerequisite: CE 410.

450-612. Environmental Engineering Design Credit 3(3-0)

The design of water and wastewater treatment systems. Topics include the functional design of physical, chemical and biological treatment processes; the design of pump stations; and the design of sludge treatment processes. Prerequisite: CE 410.

450-614. Stream Water Quality Modeling Credit 3(3-0)

Mathematical modeling of water quality in receiving streams. Topics include: The generation of point and nonpoint sources of pollutants; the modeling and prediction of the reaction, transport and fate of pollutants in the stream; and the formulation and solution of simulation models. Prerequisite: CE 410.

450-618. Air Pollution Control Credit 3(3-0)

Introduction to air pollution and its control. Topics include: sources, types, and characteristics of air pollutants; air quality standards; and engineering alternatives for achieving various degrees of air pollution control. Prerequisite: Senior Standing.

450-622. Design of Earth Structures Credit 3(3-0)

Design fundamentals to provide embankment stability considering different methods of analysis and failure mechanisms in natural and artificial slopes. Design of earth dams considering seepage and piping. Prerequisite: CE 420.

450-640. Structural Dynamics Credit 3(3-0)

Analysis and design of structures subject to dynamic loading, considering single and multi degree of freedom approaches, and vibration of structural components including damping. Prerequisite: CE 340 and ME 337.

450-642. Design of Prestressed Concrete Structures Credit 3(3-0)

Analysis and design of prestressed concrete structures using current ACI codes. Included are basic concepts, flexural members, compression and tension members and deflection calculations. Prerequisites: CE 342.

450-644. Finite Element Analysis I Credit 3(3-0)

Analysis of continuous structural systems as assemblages of discrete elements. Applications of the finite element method is made to the general field of continuum mechanics. Convergence properties and numerical techniques are discussed. Prerequisite: Math 350.

450-652. Pavement Design Credit 3(3-0)

Effects of traffic, soil, environment, and loads on the design and behavior of pavement systems. Design of pavement systems with consideration for drainage and climate. Pavement performance and performance surveys discussed. Prerequisite: CE 350 and CE 422.

SCHOOL OF NURSING
Beverly Malone, Dean

NURSING

600-100. Nursing Orientation Credit 1(1-0)

The course is a survey of the University and its programs with emphasis on broadening the student's knowledge of nursing as a discipline and as a profession. Open to all potential Nursing majors.

600-200. Perspectives of the Nursing Profession I Credit 1(1-0)

The study of nursing as a profession is explored and related to cognitive knowledge base to begin practice in the profession. Included are concepts and theories basic to the practice of nursing.

600-201. Nursing Competency Laboratory I Credit 1(0-2)

The focus in this laboratory course is on the development of a personal philosophy of nursing practice and introduction of a limited number of basic psychomotor nursing skills.

600-210. Perspectives of the Nursing Profession II Credit 3(3-0)

This course provides the foundation for further study in Nursing. Emphasis is on an integrative approach to the study of basic needs of man and the nursing process in selected patient care situations.

600-211. Nursing Competency Laboratory II **Credit 2(0-5)**

The focus of this laboratory course is on the development of selected basic nursing skills, increased familiarity with selected health care terminology, and the essential mathematical and measurement skills. Opportunity is provided to apply the Nursing process at a beginning level with selected patients.

600-290. Transition to Baccalaureate Nursing **Credit 2(2-0)**

This course is designed to facilitate the transition of Registered Nurse students into the Baccalaureate Nursing Program. The philosophy, objectives and policies of the University and the School of Nursing are introduced. Academic, social and personal adjustment to the University are discussed. Emphasis is on the logical and critical application of the nursing process.

600-300. Health Needs of the Nuclear Family **Credit 5(5-0)**

This course is designed to provide students an opportunity to broaden their knowledge of the family process. The focus will be on the Life Cycle of Man from Conception through Young Adulthood. The emphasis will be centered on the needs of the family and its members, the human development process, and common health problems of the pregnant client and children. This content provides the theoretical base for Nursing 301 — Nursing Competency Laboratory III — and Nursing 302 — Nursing Practice I.

600-301. Nursing Competency Laboratory III **Credit 1(0-2)**

A laboratory course designed to focus on the acquisition of psychomotor skills pertinent to administering care to members of the nuclear family with emphasis on the pregnant client and children.

600-302. Nursing Practice I **Credit 4(0-12)**

This course is a nursing practice course with emphasis on the application of the nursing process when providing care to members of the nuclear family. The focus is on nursing care of the pregnant client and children. Two six-hour or three four-hour practice periods are scheduled.

600-310. Pathophysical Needs of Man I **Credit 5(5-0)**

A study of the nature of health and illness with emphasis on the pathological manifestations in selected adult patients. Emphasis is on understanding pathophysical manifestations caused by illness and disability. Additionally, the psychosocial, socio-economic and maturational aspects of specific pathophysical problems are explored. The content provides the theoretical base for Nursing 311 and 312.

600-311. Nursing Competency Laboratory IV **Credit 1(0-2)**

A laboratory course designed to provide the student with the opportunity to develop psychomotor skills requisite to meeting needs of patients with specific pathophysical conditions as discussed in Nursing 310.

600-312. Nursing Practice II **Credit 4(0-12)**

This is a nursing practice course with emphasis on the care of the adult patient. The focus is on application of the nursing process when providing nursing care to patients with selected pathophysical conditions. Two six-hour or three four-hour practice periods are scheduled.

600-380. Man's Health and the Environment **Credit 2(2-0)**

This course is designed to study the relationship between man and his environment. It includes specific diseases/conditions having the causative agent present in the environment. The learner will have the opportunity to explore the leadership role in planning for changes to meet the current health needs.

600-393. Management in Health Care Settings **Credit 3(3-0)**

This course is designed to explore the concepts and theories of management as it is applied to health care settings. Principles of management and communication provide a framework for the student to examine the processes of interpersonal feedback, decision-making and outcome criteria in appraising staff performance. Conflict management including problem-solving and the concept of power will be discussed as factors in affecting change within health care organizations.

600-400. The Pathophysical Needs of Man II **Credit 6(6-0)**

This course is a continuation of Nursing 310. The focus is on the acquisition of knowledge related to complex problems of the ill adult patient. Theories of nursing management, rehabilitation and restoration are explored. The content provides the theoretical base for Nursing 401.

600-400.02. The Pathophysical Needs of Man II **Credit 6(6-0)**

This course is a study of selected complex pathophysiologic alteration which disrupt man's need gratification. The standardized nursing care plan will be used to enhance the student's theoretical knowledge base of the nursing process.

600-401. Nursing Practice III **Credit 6(0-18)**

This is a nursing practice course. Focus is on application of the nursing process in meeting the nursing needs in complex situations. Emphasis is placed on providing learning opportunities for increasing nursing competence when meeting the nursing needs of the ill adult patient. Three six hour practice periods or a total of eighteen hours per week are scheduled.

600-401.15. Nursing Practice III **Credit 6(0-)**

This course provides the student the opportunity to develop skill in providing comprehensive nursing care to selected patients with multi-system health problems. The student becomes more efficient in assuming the specific nursing roles in providing care to selected patients. The student becomes more self directed and increasingly independent in the performance of nursing tasks and utilizes the member of the health team in meeting the needs of patients and their families when indicated.

600-408. Nursing Intervention in Crisis **Credit 3(3-0)**

This course is designed to provide the student with an opportunity to study data relative to individuals, families, and communities experiencing crises. The focus will be crisis theory, principles, concepts, helping role and methodology for intervention.

600-410. The Psychosocial Needs of Families **Credit 6(6-0)**

This course is designed to explore concepts and theories related to community and psychiatric-mental health nursing. Emphasis is placed on the nursing process as a framework for promoting, maintaining and restoring the health of individuals and families within the community. The research process is incorporated as a methodology to study ethical-legal and socio-cultural issues effecting the nursing care of clients with community health and psychiatric-mental health problems. This course provides the theoretical base for Nursing 411.

600-411. Nursing Practice IV Credit 6(0-18)

This is a nursing practice course with emphasis on the learner applying the nursing process to meet the complex health needs of individuals and families in community and psychiatric-mental health care setting. The interactional process provides a conceptual framework in which the therapeutic nurse-client relationship is analyzed. Elements of the research process are used to examine community health and psychiatric-mental health problems.

600-500. Survey of Human Sexuality Credit 3(3-0)

This course explores theories and concepts of human sexuality throughout the life cycle. It enables the learner to recognize the need for counselling in all areas of sexuality through the exploration of human sexual behavior. Additionally, it includes normal sexual responses and common sexual dysfunctions.

600-501. Dimensions of Death Education Credit 3(3-0)

This course will heighten one's self-awareness of death through the study of sociological, psychological, cultural, and biological concepts. Additionally, it will enable the student to cope with this inevitable experience.

600-504. Independent Study Credit 3

An independent study on a specific topic or area in nursing to gain increased knowledge and/or skills enables the student to do research and/or practice in an area of interest in nursing under the guidance of the instructor.

600-563. Nursing Seminar. Credit 2(2-0)

The study of nursing and the investigation of methodologies in search of greater depth of knowledge and understanding for the improvement of nursing practice.

AEROSPACE STUDIES
Lt. Col. Walter L. Watson, Jr.

GENERAL MILITARY COURSE

Freshmen

910-101. The U.S. Air Force Today I Credit 1(1-0)

This course introduces the Air Force to the student. It includes the study of Air Force doctrine, mission, and organization; U.S. Strategic Offensive and Defensive Forces, their mission and function. To be offered in the fall semester.

910-102. Leadership Laboratory Credit 0(0-1)

This course provides the student with a knowledge of basic drill and ceremonies; the correct wear of the Air Force uniform; customs and courtesies; the environment of an Air Force base; and the benefits, opportunities, privileges and responsibilities associated with an Air Force commission. Must be taken in conjunction with A.S. 101.

910-103. The U.S. Air Force Today II Credit 1(1-0)

This course adds to the student's understanding of Air Force commands; U.S. General purpose and Aerospace support forces; and gives special attention to the Soviet threat by comparing the U.S. and the U.S.S.R. To be offered in the Spring semester.

910-104. Leadership Laboratory Credit 0(0-1)

This course is a continuation of A.S. 102. The student learns more about giving military commands, instructing, correcting and evaluating the skills taught in A.S. 102. More detailed information is provided about the Air Force environment and the career opportunities that are available. Must be taken in conjunction with A.S. 103.

910-201. The Development of Air Power I Credit 1(1-0)

This course focuses on the development of air power from balloons and dirigibles through two World Wars and the jet age, the evolution of air power concepts and doctrine; the role of technology in the growth of airpower, and an assessment of oral communicative skills. To be offered in the Fall semester.

910-202. Leadership Laboratory Credit 0(0-1)

This course studies Air Force customs and courtesies; drill and ceremonies; Air Force environment; and the life and work of an Air Force junior officer. Must be taken in conjunction with A.S. 201)

910-203. The Development of Air Power II Credit 1(1-0)

This course traces the history of the U.S. Air Force from its beginning as a separate service in 1947 through the Reagan administration. It surveys the period of the cold war after WW II; role of U.S. air power in the Vietnam conflict; and briefly surveys the aerospace future. An assessment of written communicative skills is performed. To be offered in the Spring semester.

910-204. Leadership Laboratory Credit 0(0-1)

This course continues the study of Air Force customs and courtesies; drill and ceremonies; Air Force environment and the life and work of an Air Force junior officer. Field Training Orientation is also provided. Must be taken in conjunction with A.S. 203.

PROFESSIONAL OFFICER COURSE

Juniors

910-401. The Professional Officer I Credit 3(3-0)

An integrated management course emphasizing the role and function of a manager. Encompasses management as it has developed through recorded history and also the social and physical setting of a manager in an Air Force environment. Individual motivation and behavioral processes, communication, and group dynamics are covered to provide a foundation for the development of the junior officer's professional skills. The basic management process involving decision-making, planning, organizing, directing, and controlling are emphasized. Attention is focused on the progressive development of communicative skills needed by junior officers. To be offered in the Fall semester.

910-402. Leadership Laboratory Credit 0(0-1)

Allows the student to apply leadership and management principles through participation in advanced leadership experiences. This involves organizing, and conducting drill and ceremony functions; preparing and presenting group briefings; and evaluating the performance of GMC cadets. Must be taken in conjunction with A.S. 401.

910-403. The Professional Officer II Credit 3(3-0)

A study of leadership theory and its application to real-world problems. Prepares the student for adjusting to a rapidly changing world without difficulty. Focuses on the broader aspects of management, on personal and social values and the place that management takes in molding a better environment. An overview of the details of what managers should do with emphasis on the leadership roles of Air Force officers. To be offered Spring semester.

910-404. Leadership Laboratory **Credit 0(0-1)**

A continuation of A.S. 402. The student continues to develop personal leadership and management competencies through participation in advanced leadership experiences. The student will also be involved in the planning and conduct of several special projects and events including the Military Ball and the Cadet Corps Dining-In. Must be taken in conjunction with A.S. 403.

Seniors

910-501. National Security Forces in Contemporary American Society I **Credit 3(3-0)**

This course conceptually focuses on the Armed Forces as an integral element of society with emphasis on the broad range of American Civil-Military relations and the environmental context in which defense policy is formulated and implemented. Special themes include: the role of the professional military leaders — managers in a democratic society; the fundamental values and socialization processes associated with the Armed Services; the requisites for maintaining adequate national security forces; political, economic, and social constraints on national security. The student will be aware of the impact of technological and international developments of national defense. Students prepare oral and written presentations to supplement class discussions, seminars, and conferences. To be offered Fall semester.

910-502. Leadership Laboratory **Credit 0(0-1)**

This laboratory is an integral and mandatory portion of the Aerospace Studies curriculum. It is designed to develop each student's leadership potential and serve as an orientation to Active Duty. Students are involved in the planning, organizing, coordinating, directing, and controlling of military activities in the Cadet Corps. Must be taken in conjunction with A.S. 501.

910-503. National Security Forces in Contemporary American Society II **Credit 3(3-0)**

This course is a continuation of A.S. 501. The student uses the analytical skills gained in A.S. 501 to predict the outcome of world situations. Students are given the opportunity to apply listening, speaking, and writing skills in typical military situations with accuracy, clarity, and appropriate style. National and international determinants and constraints relating to the use of national power are discussed. The student should comprehend selected provisions of the military justice system as they relate to responsibilities of the military officer.

910-504. Leadership Laboratory **Credit 3(3-0)**

This laboratory is a continuation of A.S. 502. It provides the students with practical command and staff leadership experiences through their performance of various tasks within the framework of an organized Cadet Corps. This lab is further designed to provide the students with information which will facilitate a smooth transition from civilian status to Air Force life. Must be taken in conjunction with A.S. 503.

FLIGHT INSTRUCTION

910-505. Flight Training — Ground School **Credit 3(3-0)**

This course is devoted to the study of Federal Aviation Regulations, basic aerodynamics, aircraft systems, navigator, meteorology and performance data. Required for all Pilot Trainees and open to all other students. May be taken concurrently with A.S. 506.

910-506. Flight Training — Flying **Credit 3**

Flight Instruction provided to teach the fundamentals of take-offs, landings, stall, steep turns, traffic patterns, air discipline, basic flight maneuvers and emergency procedures required for all Pilot Trainees. Only Advanced POC Cadet Pilot Trainees will be offered flight training at AFROTC expense.

MILITARY SCIENCE
Lt. Col. Benjamin F. Foster, Jr.

920-101. Introduction to Citizen/Soldier **Credit 1**

An introduction to the mission, organization and history of the ROTC: Military and civilian obligation in relation to National Security; Individual Arms and Marksmanship Techniques Emergency Medical Treatment. Leadership Laboratory training to include thorough indoctrination in military courtesy and customs of the service, drill experience, development of initiative and self-confidence.

920-102. Introduction to United States Military Forces in Support of National Defense **Credit 1**

A discussion of the mission and responsibilities of the United States Military Forces in Support of National Security with emphasis on the role of the individual participating citizen. Leadership Laboratory is a continuation of MS 101 Laboratory.

920-201. Branches of the Army and Leadership Principles **Credit 1**

A detailed study of the applicability of leadership principles, traits, and techniques in all job areas. Additionally, an appreciation is developed for leadership counseling techniques.

920-202. Map reading Skill Development **Credit 1**

A detailed study of orienteering to include basic fundamentals of map reading, grid systems, scale and distance, elevation and relief, military symbols, direction and location, and utilization of the declination diagram. Leadership Laboratory is a continuation of MS 201 Laboratory.

920-206. Army ROTC Basic Camp (Internship Program) **Credit 4**

This course consists of 6 weeks of training at Fort Knox, KY. Training consists of Army History, Role and Mission Map Reading/Land Navigation, Rifle Marksmanship, Basic Leadership Techniques, Physical Training/Marches, Individual and Unit Tactics, Communications, First Aid, Drill, Parades and Ceremonies, Military Courtesy, and Traditions. This course also teaches the student the ability to think and perform under pressure.

920-301. Introduction to Military Team Theory **Credit 3**

How to prepare and conduct military training, to include presentation and communication techniques. Included in this phase of instruction is a 10-minute oral presentation, how to cope with basic problems, i.e., discipline, motivation, encountered in small units, leadership training designed to further develop planning and organizational skills, fundamentals of offensive and defensive tactics, orientation to the branches of the Army.

920-302. Military Skill/Leadership Training **Credit 3**

Brief overview of the organization of the Soviet Army. A review of the principles and fundamentals of small unit tactics, and the application of the principles of offensive and defensive combat to units of the infantry battalion. Familiarization with characteristics, operation and employment of small unit weapons, communication systems and equipment, and continued development of selected Military Skills. Orientation relative to administrative procedures, required standards of performance, and general conduct of training at ROTC Advanced Summer Camp. Continuation of Leadership Laboratory Training conducted in MS 301.

920-306. Army ROTC Advanced Camp (Internship) **Credit 4**

Normally taken the summer following junior year. The training is conducted at designated U.S. Army Installations. This training provides cadets with practical experience in leadership, Military Training, small unit tactics, weapons qualifications, and communications. This internship is six weeks duration.

920-401. Leadership Management and Professional Development **Credit 3**

Leadership management and professional development, a study of the U.S. Army Personnel Management System, methods of conducting Command and Staff and Unit meetings, how to prepare military correspondence, ethics and professionalism, military justice.

920-402. Management Simulation and Active Duty Orientation **Credit 3**

Management simulation exercise and Active Duty orientation, small unit effectiveness and Army Training Management, the U.S. Army logistics system, interpersonal skills, counseling techniques, and personnel evaluation, the Law and Principles of War, Code of Conduct and Geneva Convention, customs and courtesies of an Army officer.

920-406. Airborne Training (Internship) **Credit 3**

This course consists of 3 weeks of intensive airborne training training to include physical conditioning, landing techniques, parachute safety, simulated jumps, procedure in and around aircraft, and five (5) combat jumps from Air Force aircraft flying at 1250 feet.

920-105, 107, 205, 207. Leadership Laboratory **Credit 1**

Leadership Lab is in conjunction with each of the aforementioned M.S. level classes in the basic course. It is a period which supplements and reinforces, through practical application, the fundamentals taught in each of the Military Science classes. Leadership Lab is a progressive learning experience designed to produce effective and efficient Second Lieutenants for the United States Army.

920-305, 307, 405, 407. Leadership Laboratory **Credit 0**

Leadership Lab is in conjunction with each of the aforementioned M.S. level classes in the advanced course. It is a period which supplements and reinforces, through practical application, the fundamentals taught in each of the military Science classes. Leadership Lab is a progressive learning experience designed to produce effective and efficient Second Lieutenants for the United States Army.

THE LEARNING ASSISTANCE CENTER

Sandra Alexander, Director

Program of Instruction

777-099. Basic Reading and Writing Skills **Credit 4**

This course covers the six basic reading skills: word recognition, meanings, study skills, flexibility, appreciation, and interests; mastery of sentence structure, rudiments of grammar, mechanics and vocabulary study.

777-100. Orientation **Credit 1**

A familiarization with methods of improving study, taking notes and using the library.

777-101. Intermediate Mathematics **Credit 3**

Elementary properties of real numbers and basic algebra through solving of quadratic equations by various means. Required of students whose mathematics SAT scores are low and whose major curriculum includes either Mathematics 101 or Mathematics 111.

Credit is given for all Learning Assistance Center courses taken. However, no quality points are received for Mathematics and English courses unless the Department Head approves the use of these courses as electives.

The Learning Assistance Center will accept, on a referral basis, any student who feels that he/she needs tutorial assistance in Mathematics and/or English. An instructor may also refer a student to the Center.

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- Pearl G. Bradley, Speech
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- Carolyn C. Crawford, Home Economics
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- C.R.A. Cunningham, Biology
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- Ann Davis, Home Economics
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- Clara V. Evans, Home Economics
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- E. Bernice Johnson, Home Economics
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- Wadaran L. Kennedy, Animal Husbandry
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